FOOD INDUSTRIES

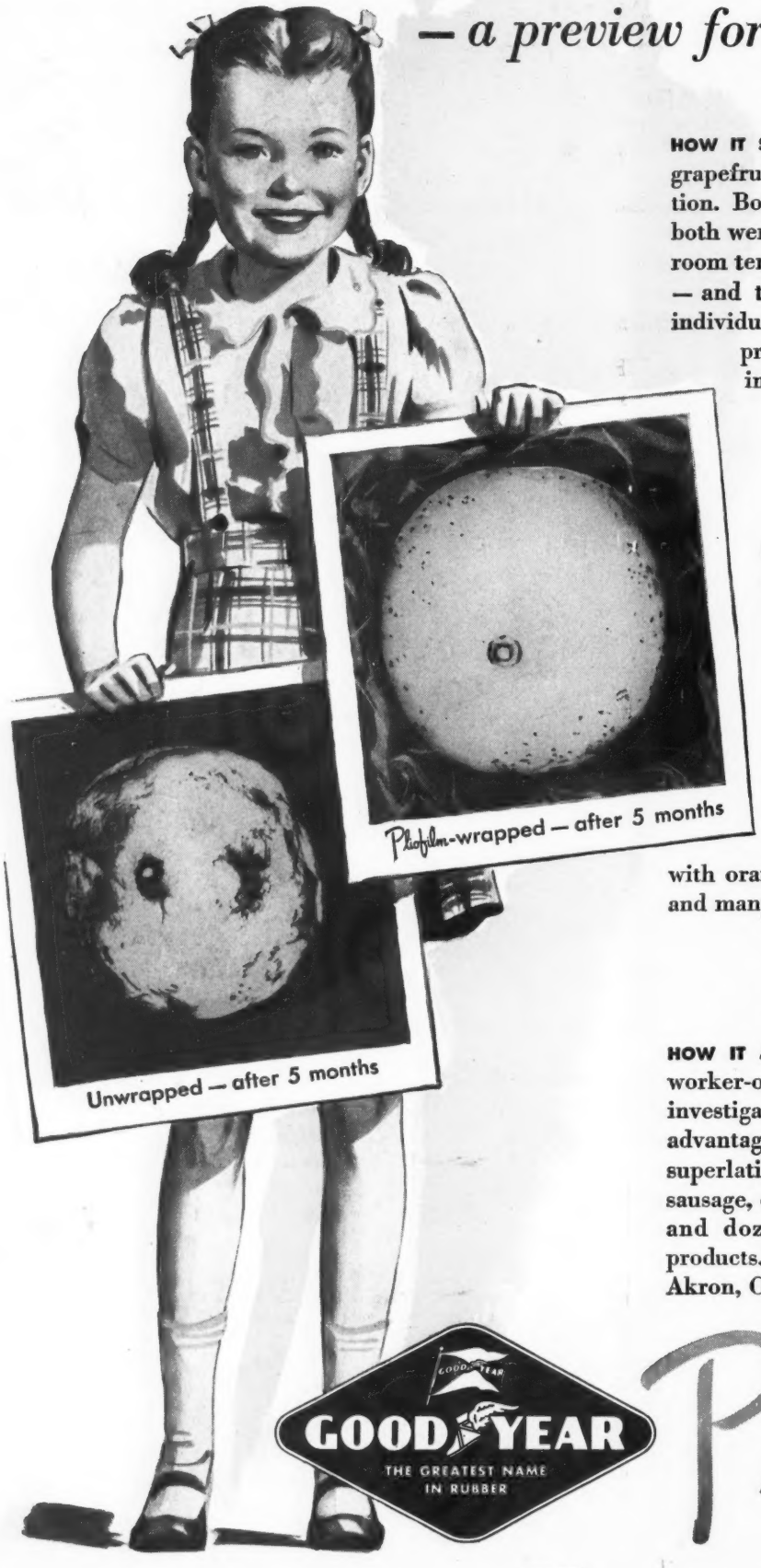
JULY 1943

BONDS
STAMPS
VICTORY

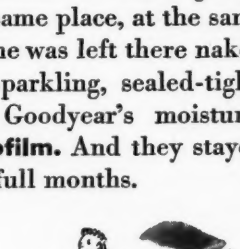
✓ R V.15² Jy-D 1943

The Grapefruit that wouldn't grow old!

— *a preview for smart packagers*



HOW IT STARTED. Once there were two groups of grapefruit, identical twins in juicy, fresh perfection. Both were picked from the same grove; both were stored in the same place, at the same room temperature. But one was left there naked — and the *other* wore sparkling, sealed-tight, individual wrappers of Goodyear's moisture-proof, airproof **Pliofilm.** And they stayed in storage for five full months.



HOW IT CAME OUT. The photographs (left) tell the story pretty clearly. So does the report of the Agricultural Experiment Station of the University of Florida, which made the test: "The grapefruit wrapped in **Pliofilm** showed no loss of flavor and little shrinkage as compared with the unwrapped fruit... the original appearance of the fruit was unchanged...Vitamin C content very slightly diminished." And tests with oranges, lemons, apples, peaches, mangoes and many vegetables all brought similar results!

HOW IT AFFECTS YOU. Pliofilm today is a war-worker-only. But wise marketers are invited to investigate now the top-freshness, top-protection advantages of **Pliofilm** for postwar packaging—a superlative safeguard for cheese, meat loaf, sausage, coffee, nuts, pharmaceuticals, chemicals and dozens of other air-moisture-sensitive products. Write: **Pliofilm** Sales Dept., Goodyear, Akron, Ohio.

GOODYEAR
THE GREATEST NAME IN RUBBER

Pliofilm

Pliofilm—T. M.
The Goodyear Tire & Rubber Company

Tech

JULY
FOOD TECHNOLOGY

DAIRY PRODUCTS
Calcium and Phosphorous in Cottage Cheese 143
Positive Phosphatase in Refrigerated Cream 143
Manual of Dairy Detergents and Cleaning Practices 78

PACKAGING
Container Lining Wax..... 143

CEREAL PRODUCTS
Fermentation of Kiln-dried Corn..... 143
Dry-substance Tables for Starch Suspensions 143
Mechanical Treatment Destroys Insects in Foods 82

BAKING
Using Sugar to Best Advantage Under Rationing 74

DEHYDRATION
This is What It Costs to Dehydrate Vegetables 64
Sanitation Pays Dividends to the Egg Dehydrator 90

FATS AND OILS
Olive Oil Substitutes..... 144
Unsaturated Fatty Acids of Hydrogenated Fats 144
Antioxidants for Fruit Oils..... 144

FRUITS AND VEGETABLES
Wetting Agents Speed Washing..... 81

VITAMINS
Brewer's Yeast 145
Vitamin B Complex in Dehydrated Meat.. 145

WASTE DISPOSAL
How To Meet the Demand for Better Waste Disposal 84
New Vacuum Flotation Process Aids Liquid Waste Disposal..... 87

MISCELLANEOUS
Potato Flour 146
Preservation of Eggs 146
Wartime Problems and Progress Discussed by IFT..... 61
Tests Show Bactericidal Power of Ultraviolet 92
Research Finds Substitute for Bacteriological Agar 94

THE COVER

Because this issue of *Food Industries* reaches the readers close to the date of July 4, the American Flag is reproduced on the cover in celebration of Independence Day. Published for the first time in 1942, this cover is repeated because of its special wartime significance.

EVERY MONTH

The Talk of the Industry..... 58
New Packages and Products..... 98
The Food Industry News..... 103
Men, Jobs and Companies..... 121
Food Equipment News..... 125
Just Off the Press..... 131
Books 132
Questons and Answers..... 133
Patents 134
Food Technology—Abstracts 143
Letters to the Editor..... 147
Formulas 149

FOOD INDUSTRIES

M. A. WILLIAMSON, *Publisher* — LAURENCE V. BURTON, *Editor*

E. S. STATELER, *Associate Editor, Chicago* — G. L. MONTGOMERY, *Associate Editor*
F. K. LAWLER, *Managing Editor* — RAY LADUE, *Art Editor*
GRACE HIGHTOWER, *Assistant Editor* — ELIZABETH B. SHAW, *Assistant Editor*
S. T. Henry, Spruce Pine, N. C. — R. S. McBride, Washington, D. C.
Earle Mauldin, Atlanta, Ga. — Paul Wooton, Washington, D. C.
N. A. Bowers, San Francisco, Calif.

VOL. 15, No. 7 — **JULY, 1943**

FOOD PLANT SANITATION A MUST IN WARTIME..... 77

SPECIAL FEATURES
Food Processors Have a Public Relations Task *By L. V. Burton* 57
Wartime Problems and Progress Discussed by IFT *By G. L. Montgomery* 61

DEHYDRATED FOODS
This Is What It Costs To Dehydrate Vegetables *By W. D. Ramage and C. L. Rasmussen* 64

MANAGEMENT
Watch the Details in Truck Operations..... 72

MATERIALS
Using Sugar To Best Advantage Under Rationing—Part II *By Jan Micka* 74
Directory of Egg Drying Plants..... 76

SANITATION
Manual of Dairy Detergents and Cleaning Practices *By M. E. Parker* 78
Wetting Agents Speed Washing.....*By R. W. Mitchell* 81
Mechanical Treatment Destroys Insects in Foods *By E. S. Stateler* 82
How To Meet the Demand for Better Waste Disposal *By Earl S. Fenelon* 84
New Vacuum Flotation Process Aids Liquid Waste Disposal *By A. J. Fisher* 87
Sanitation Pays Dividends to the Egg Dehydrator *By H. E. Gorseline, L. S. Stuart, V. H. McFarlane* 90
Tests Show Bactericidal Power of Ultraviolet *By Dale W. Johnson and C. G. Harrel* 92
Research Finds Substitute for Bacteriological Agar *By W. E. Baier and T. C. Manchester* 94

McGRAW-HILL PUBLISHING COMPANY, INC., James H. McGraw, Founder and Honorary Chairman, Publication Office: 99-129 North Broadway, Albany, N. Y. Return postage guaranteed. EDITORIAL AND EXECUTIVE OFFICES: 330 WEST 42ND STREET, NEW YORK.

BRANCH OFFICES: 520 North Michigan Ave., Chicago; 68 Post St., San Francisco; Aldwych House, Aldwych, London, W.C. 2; Washington; Philadelphia; Cleveland; Detroit; Los Angeles; St. Louis; Boston; Atlanta, Ga.

JAMES H. McGRAW, Jr., President; HOWARD EHRLICH, Executive Vice-President; MASON BRITTON, Vice-President; B. R. PUTNAM, Treasurer; JOSEPH A. GERARDI, Secretary, and J. S. BLACKBURN, Jr., Director of Circulation.

CABLE ADDRESS: "McGraw-Hill, N. Y." Member A.B.P. Member of A.B.C. Contents indexed monthly in the Industrial Arts Index.

Copyright, 1943, by McGraw-Hill Publishing Company, Inc.

mutilated

GROWING MORE FOOD
is not enough!
We need to grow more food... but growing food is not enough... it must be processed and preserved, kept ready for use whenever and wherever needed. This problem of food preservation is now a complicated one, for many materials are no longer available... nor can the food packer be sure where his product will be shipped, or how long it may be in transit or storage.
We have helped many firms to meet these wartime packaging needs, for protective packaging has always been the primary function of Riegel Papers. Their requirements and government restrictions on output now prevent us from accepting new business... but we are still just as able and willing as ever to help you find a solution to your present packaging problems, or to assist in preparing new horizons for your food packaging of tomorrow.
RIEGEL PAPER CORPORATION
342 MADISON

FOOD INDUSTRIES is published monthly. Price 35c per copy. Allo w subscriptions should be addressed to the Director of Circulation, Food In du States and Possessions Mexico, Central and South American countries, $3 $5 for two years; $6 for three years (payable in Canadian or U. S. Fund s). shillings for three years. All other countries, $5 a year, $8 for two yea rs, at Post Office, Albany, N Y., under act of March 3, 1879.

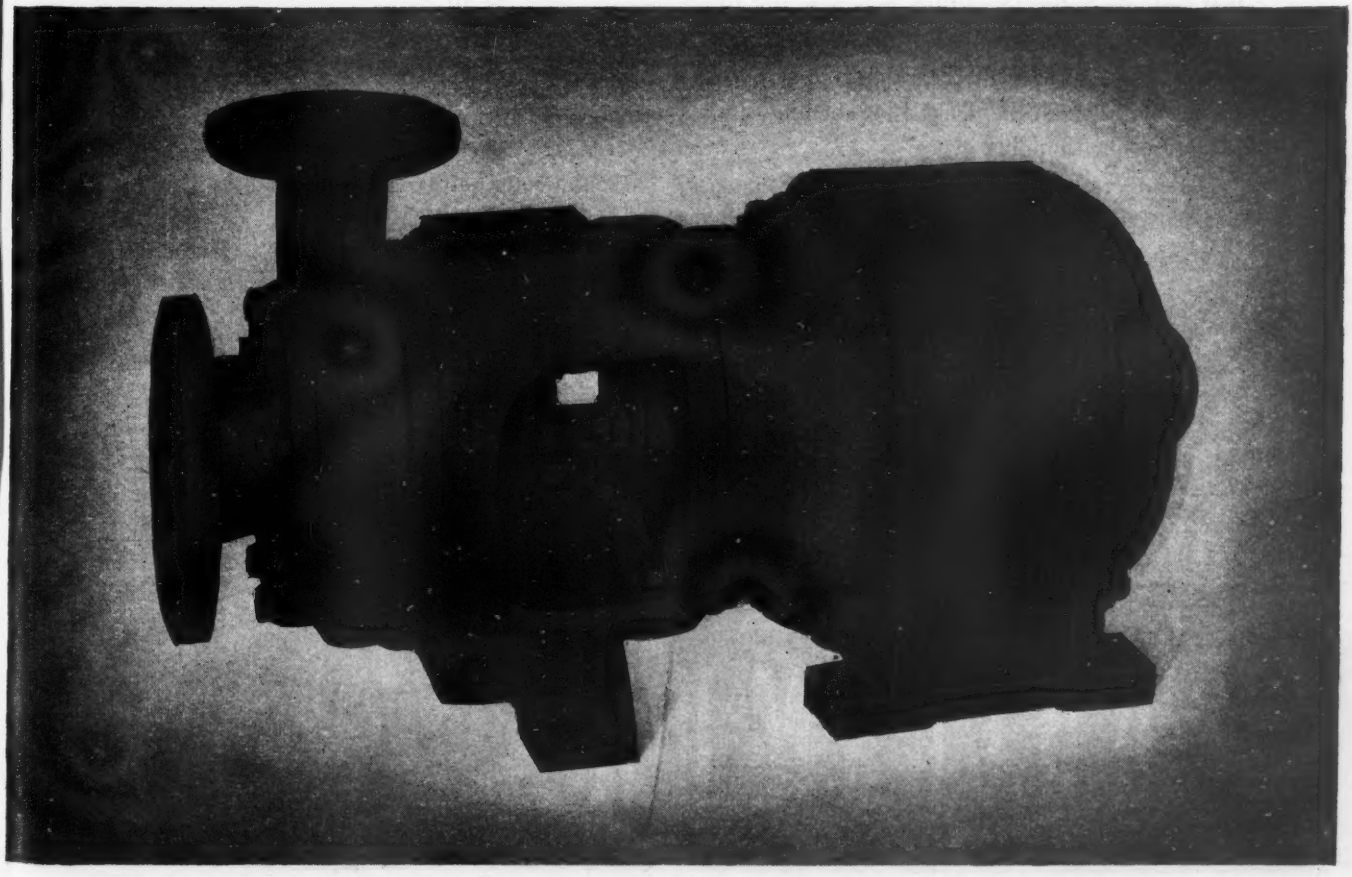
JACK OF ALL TRADES
and master of them too

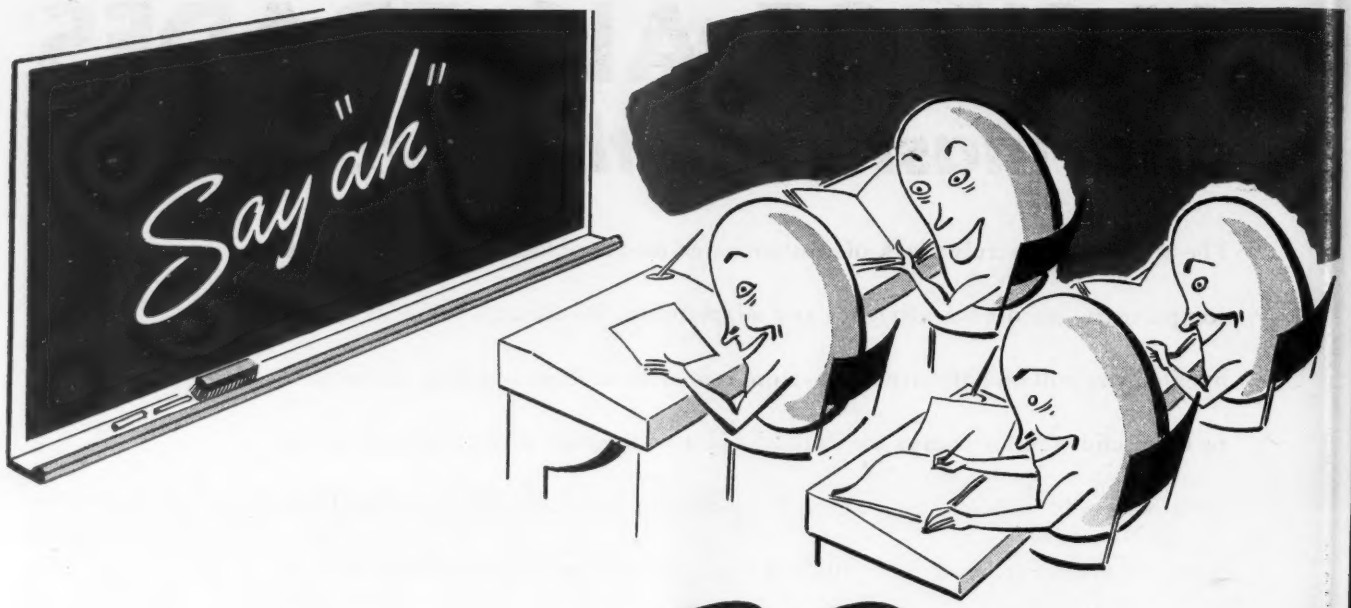
The Motorpump is truly a jack-of-all-trades, and master of them too, because of its compactness, sturdiness, efficiency and adaptability. Wherever liquids are being handled you will find Motorpumps—from refineries to ships and from the tropics to the arctic. • Motorpumps are available in a wide range of sizes and all can be installed easily without costly special foundations. Capacities range up to 1800 gpm and discharge heads up to 500 ft. • Thousands of them in all sorts of services are speeding the transport of liquids—liquids that keep machines on the job; liquids needed in processes; liquid foods; liquids that must be removed to keep mines operating, to speed construction work; etc. Ingersoll-Rand Company, Cameron Pump Division, 11 Broadway, New York, N. Y.

Ingersoll-Rand

CENTRIFUGAL PUMPS • CONDENSERS • OIL AND GAS ENGINES • ROCK DRILLS • AIR TOOLS • TURBO-BLOWERS • COMPRESSORS

9-298





HOW WE PACK THE *B-B's* THAT MADE *Boston* FAMOUS

BAKED BEANS!—with the authentic Harvard accent, now come packed in air and moistureproof cylinders.

No can! No glass! No crockery!

The container is a paper product lined with a moistureproof cellophane bag that seals the natural moisture, goodness and flavor in—and seals the air out.

Dobeckmun engineers developed the CELLOCUFF* principle of this lightweight yet fully protective package, which provides a heat-sealed transparent top through which the delectable, appetite-stirring B-B's can signal a "come hither" to the shopping eye.

Wartime restrictions have made drastic changes in packaging; and military needs posed some very unusual packaging problems. The Dobeckmun staff has done pioneering work both for civilian goods and war products and materials.

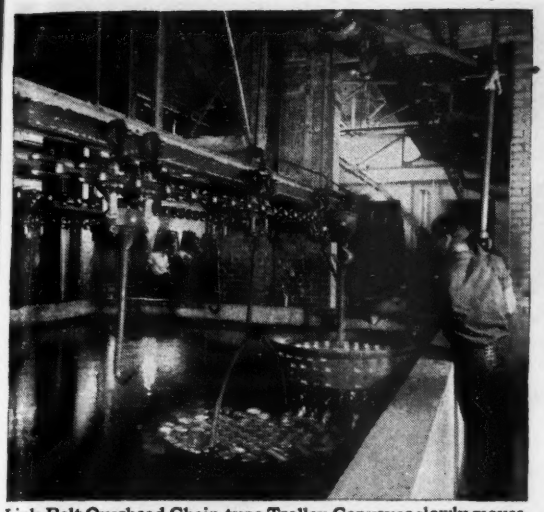
And in tackling and solving new problems they have learned many things which will be valuable to postwar business.

Right now, of course, our facilities are at the first call of war needs. But it is not too early to be thinking about your postwar packaging—not too early to open a discussion with Dobeckmun's specialists. If you're interested, we'll be glad to hear from you.

HERE'S HOW IT'S DONE:
The beans are precooked, then poured into the cellophane lined cylinder. A transparent cellophane disc is then heat-sealed over the liner. After the package is capped the beans are kept refrigerated until sold.

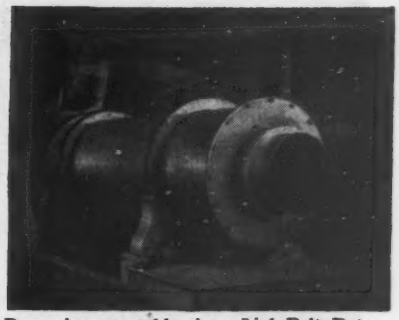
*CELLOCUFF is a trade-mark of The Dobeckmun Company.

THE DOBECKMUN COMPANY
CLEVELAND, OHIO · OAKLAND, CAL

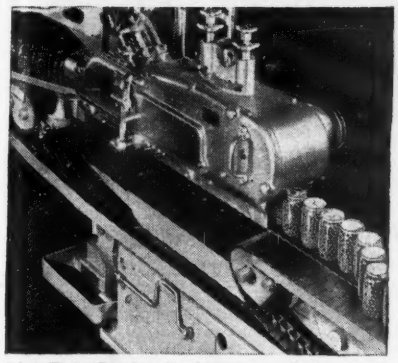


Link-Belt Overhead Chain-type Trolley Conveyor slowly moves baskets of cans through 100 ft. length of cooling tank. Ten such conveyors serve five cooling tanks.

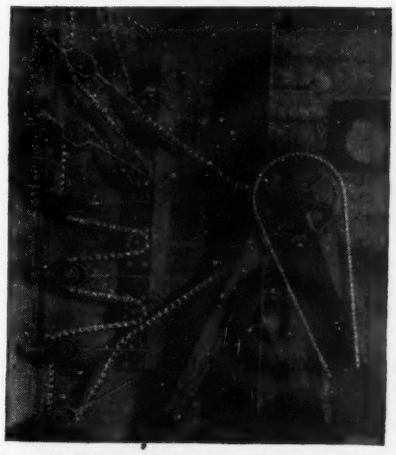
Bucket elevator-conveyor unloading fish from boat to shore reduction plant



Processing vegetables in a Link-Belt Roto-Louvre Dehydrator. Also used for dehydrating meat and other food products.



Link-Belt Carrier Chains are made in many styles and types for moving a great variety of materials.



Link-Belt Chain Drives to seven conveyors in freezing tunnel for quick-freezing shelled peas.

AT THE SERVICE OF INDUSTRY —to Keep Production "On the Move!"

● Production methods in this war have developed a new functionary: the expediter—one who clips minutes, hours or days from production schedules by speeding the movement of materials and products into and out of plants. Within the plants, from stage to stage of production, from machine to machine, as well as outside, Link-Belt conveyors and drives are nipping minutes from processes or intervals; costs tumble —hours are saved—wasted motions disappear.

Link-Belt has long specialized in the engineering and manufacturing of practically every type of mechanical conveying and power transmitting equipment, and our engineers are ready to show you how to use efficient handling systems to save time and manpower and speed production.

LINK-BELT MAINTENANCE PARTS SERVICE

Delivery of your maintenance parts may not always be prompt, so you had better play safe. Check your materials handling and power transmitting equipment now and place orders for parts likely to require early replacement, as far in advance as possible.

LINK-BELT COMPANY

Indianapolis Philadelphia Chicago Atlanta Dallas San Francisco Toronto

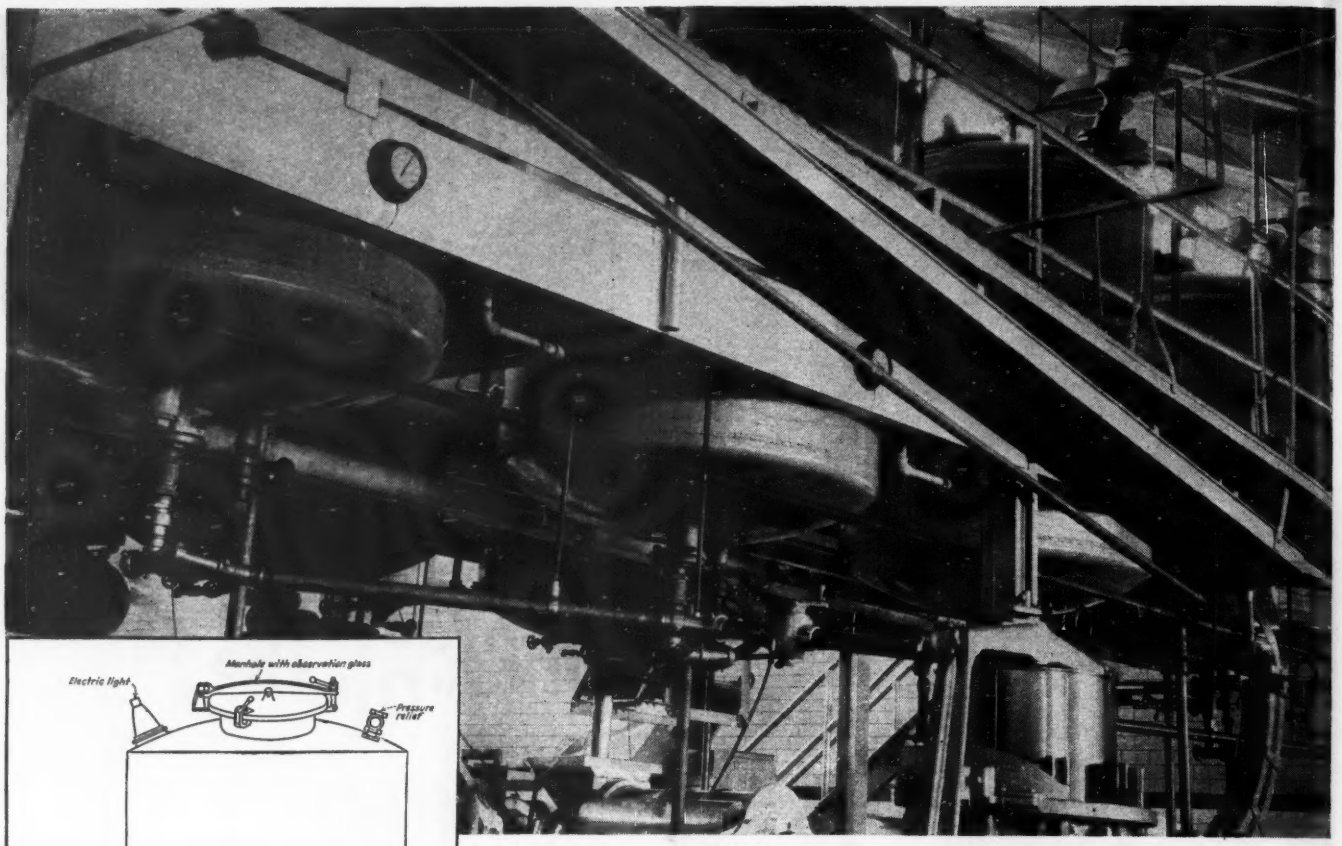
Offices, warehouses and distributors in all principal cities

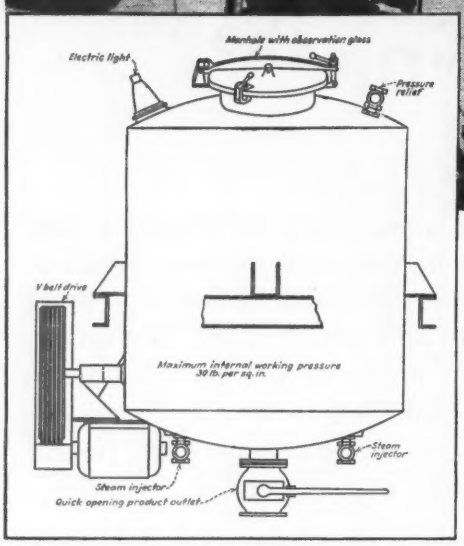
9130-A

Link-Belt Products Include: Conveyors and Elevators of all types; Chains and attachments of malleable iron, Promal, steel and other metals; Silverstreak Silent Chain Drives; Silverlink Roller Chains and Sprockets; Ice Crushers and Slingers; Liquid Vibrating Screens for Waste Recovery; P. I. V. Gear Variable Speed Drives; Speed Reducers; Ball, Babbitted and Roller Bearings; Gears; Clutches; Take-Ups; Pulleys; Couplings, etc.

LINK-BELT

CHAINS, CONVEYORS, DEHYDRATORS, TRANSMISSION UNITS





At left, detail drawing of Pfaudler Digester or Pressure Cooker used in making applesauce

Pfaudler Pressure Cookers Speed Applesauce for Dehydration

WITH the demand for dehydrated applesauce stepping up, Pfaudler glass-lined steel closed pressure cookers are filling another important requirement in the war effort. By processing in a closed vessel completely inert to organic acids, darkening of the product is avoided and speedier cooking obtained. Equally important, a minimum of critical materials is required.

Pfaudler Pressure Cookers (illustrated) handle 1800 lbs. of pared, cored apples per batch. Processing time averages about 20 minutes. No coils are used which prevents sticking, burning, or carmelization. The only moving part is the special Pfaudler stainless steel-impeller-propeller agitator.

Some plant operators fill these digesters from automatic overhead conveyors which discharge apples into top manhole opening. When about one third full, sugar is added. It is unnecessary to add water at the start because soon after heat is applied, the apples begin to soften and break up, liberating the natural juices. A speedy cook in the absence of air and without discoloration of the product is thus obtained.

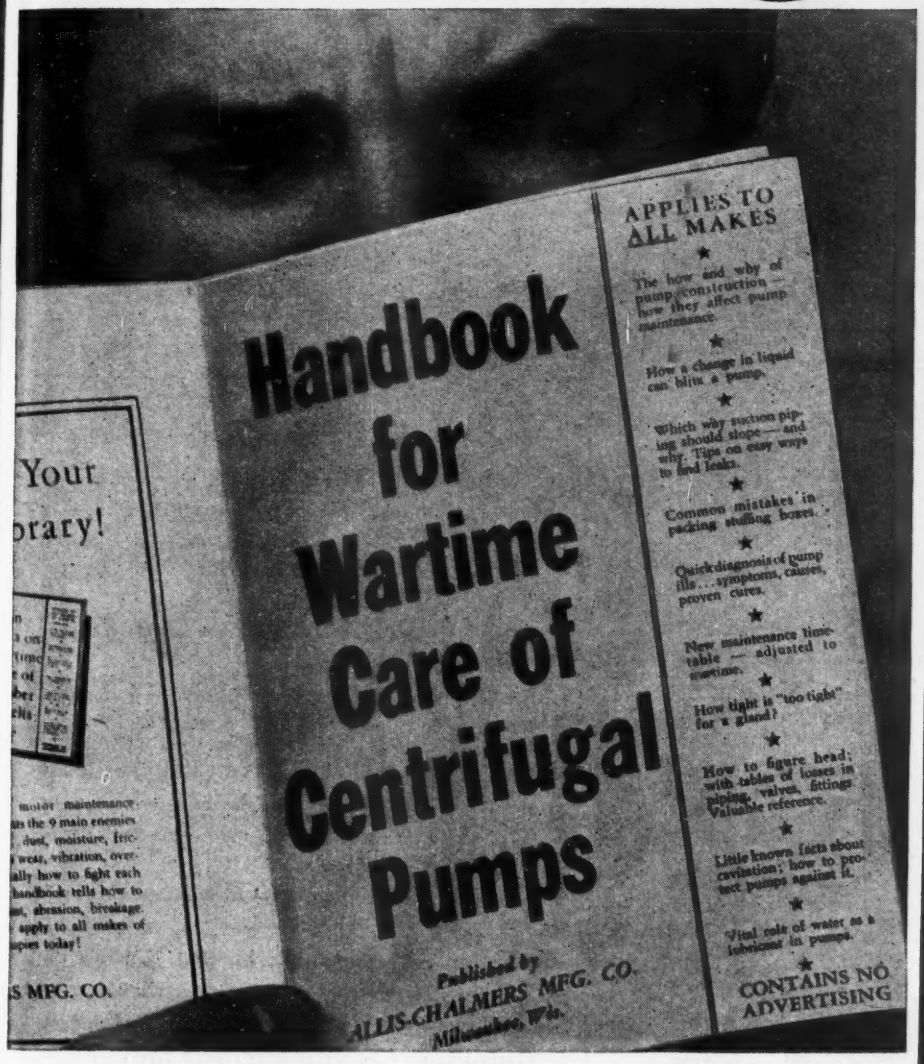
With the amount of applesauce required by the Armed forces and Lend Lease, a Pfaudler Pressure Cooker in your plant this season will "pay its way" quickly. Act now to place orders and file priority requests. An AA-3 rating is required. Let us help you get started.

Since Pearl Harbor, Pfaudler has sent back more than 1,500,000 lbs. of scrap metal to the mills. Have you any scrap you can send?

PFAUDLER

Branch Offices: New York, 330 West 42nd St.; Boston, 751 Little Bldg., Philadelphia, 1228 Commercial Trust Bldg.; Washington, D. C., 1038 Washington Bldg.; Chicago, 1442 Conway Bldg.; Detroit, 7310 Woodward Ave.; Cincinnati, 3556 Monteith Ave.; San Francisco, 1325 Howard St.

Required Reading!


Handbook for Wartime Care of Centrifugal Pumps
APPLIES TO ALL MAKES
Published by ALLIS-CHALMERS MFG. CO. Milwaukee, Wis.
CONTAINS NO ADVERTISING

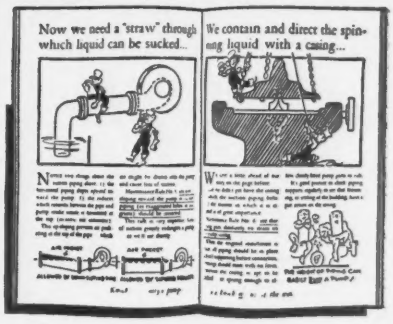
Your copy is free! Allis-Chalmers will gladly mail copies of "Handbook for Wartime Care of Centrifugal Pumps" *free of charge.* It applies to *all* makes — contains no advertising. Use it to make present pumps last — and when you *do* need new pumps, look into the extra efficiency and long life built into Allis-Chalmers centrifugal pumps . . . all types for every purpose.

ALLIS-CHALMERS
MILWAUKEE

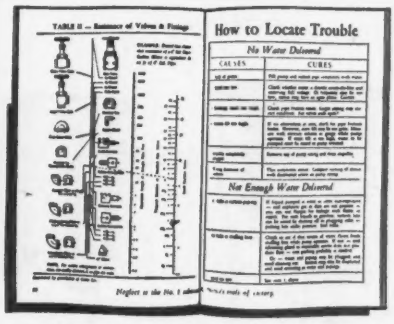
WE WORK FOR VICTORY — WE PLAN FOR PEACE

PUMPS NOW DO 4 TIMES THEIR NORMAL WORK - NEED THE FINER KIND OF CARE SET FORTH IN ALLIS-CHALMERS' NEW HANDBOOK!

EVERY EXECUTIVE, engineer and operating man should have a copy of this important new publication in his technical library. Pumps doing wartime work (8700 instead of 1800 hours a year) need *wartime care!*



To make principles of pump maintenance crystal-clear a pump is *built!*



Contents include valuable tables of friction losses, a guide to locating trouble, a maintenance timetable geared to *wartime!* Get *your* copy!

ALLIS-CHALMERS MFG. CO.
Milwaukee, Wisconsin

Gentlemen:

Yes, I would like to receive *free of charge* a copy of your "Handbook for Wartime Care of Centrifugal Pumps".

(Name)

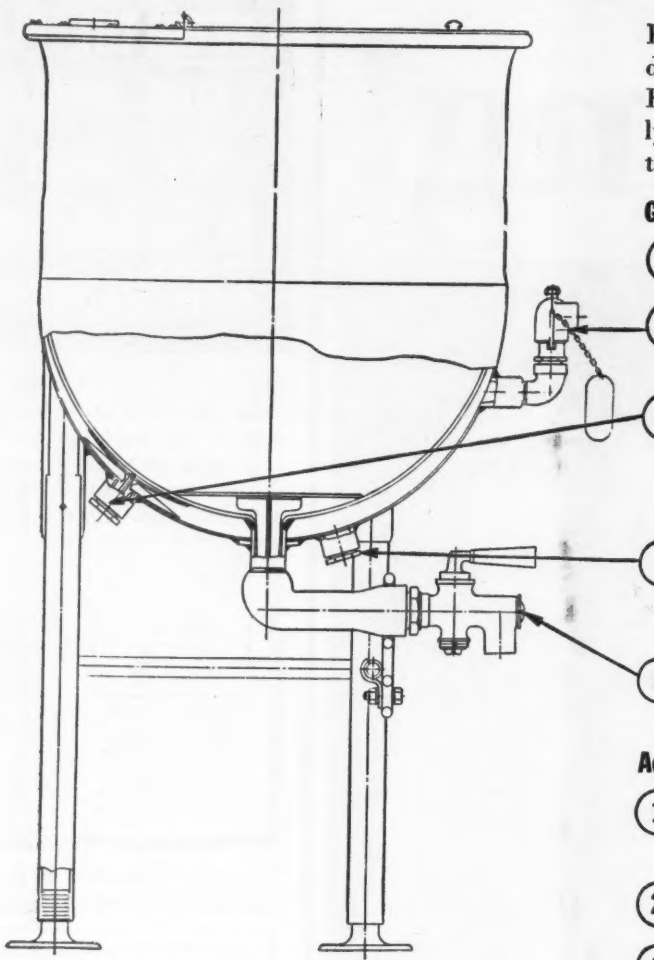
(Title)

(Company)

(Street Address)

A 1583 (City and State)

INSTRUCTIONS FOR PROPER MAINTENANCE OF WEAR-EVER STEAM-JACKETED KETTLES



Proper care of kettles is vitally important these days. To make your Wear-Ever Steam-Jacketed Kettles last longer and serve you most efficiently, follow these instructions carefully and check to see that your kettles are correctly installed:

General Instructions for all types of Kettles

1. Clean them thoroughly, inside and outside, every day.
2. **Safety Valve:** Chain on handle of safety valve should be pulled daily to insure proper functioning. Replace missing valves.
3. **Steam Inlet:** Be sure steam intake line is attached to this specific fitting which is provided with a baffle plate. Steam intake pipe should be same size as the inlet fitting for at least the last 30 inches in the line.
4. **Steam Outlet:** Steam return line should be equipped with a good grade condensation trap of proper size. Condensed steam must be removed from jacket for efficient performance.
5. **Draw-off Faucet:** Take advantage of clean-out features that are provided in faucet for long life and convenience.

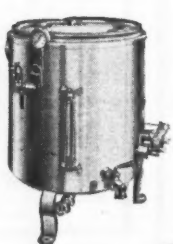
Additional Instructions for Trunnion Type Kettles

1. **Drain Valve:** When operation begins from a cold start, open drain valve at bottom to bleed water from jacket.
2. **Packing Nut Gland:** Tighten this nut occasionally to prevent leakage.
3. **Handle Assembly:** Remove handle lock screw occasionally to clean out and oil assembly.

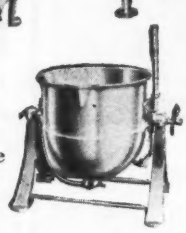
Additional Instructions for Gas-Heated Kettles

1. Be sure water in jacket is at all times maintained at proper level as shown on gauge glass. If kettle is allowed to boil dry, damage will result.
2. Clean gas fixtures regularly to maintain proper flow and combustion of gas.

Deep Type Kettle



Gas-Heated Kettle



Trunnion Type Kettle

Shallow Type Kettle

For further information on the use and care of your kettles, write for the book, "Wear-Ever Steam-Jacketed Kettles". The Aluminum Cooking Utensil Company, 307 Wear-Ever Bldg., New Kensington, Pa.

Subsidiary of Aluminum Company of America

Wear-Ever Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT OFF.

★ WHEN IT'S ALL OVER W-E WILL BE BACK! ★

"Again destruction strikes us out of nowhere!"

The modern miracle of RADAR has sought out the enemy far beyond the range of human eye and ear —and destroyed him. RADAR means "radio detection and ranging" and is a department of electronics. By radio waves of ultra high frequency, RADAR locates targets at astonishing distances. This "secret weapon" is unaffected by fog, storm, or darkness.

Even before Pearl Harbor, Greer had a hand in plans for producing RADAR for U. S. fighting ships. It will be no surprise in the bakery and confectionery fields — where Greer precision machines have long been famous — to learn that Greer is performing notable service in supplying such precision equipment as RADAR to the Navy now.

Out of the sweat and pressure of war production, Greer has learned much. Through this new knowledge — including applications of electronics — we hope to give you better post-war equipment. We believe our engineering ability and experience can be of unusual value to you in planning *your* peacetime operations. Let us hear from you.

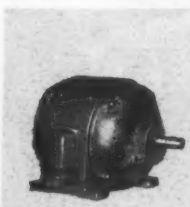
J. W. Greer Co., 119 Windsor St., Cambridge, Mass.

MAKERS OF FAMOUS **GREER** **MULTI-TIER CONVEYORS**

As You Equip for S

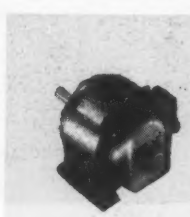
Let G.E. Advise You on M

G-E STANDARD TRI/CLAD MOTOR



On pumps, blowers, sifters, packaging machinery, meets most drive requirements of spray-drying plants. Smooth contours are easy to keep clean. No openings in upper portion.

G-E SPLASHPROOF TRI/CLAD MOTOR



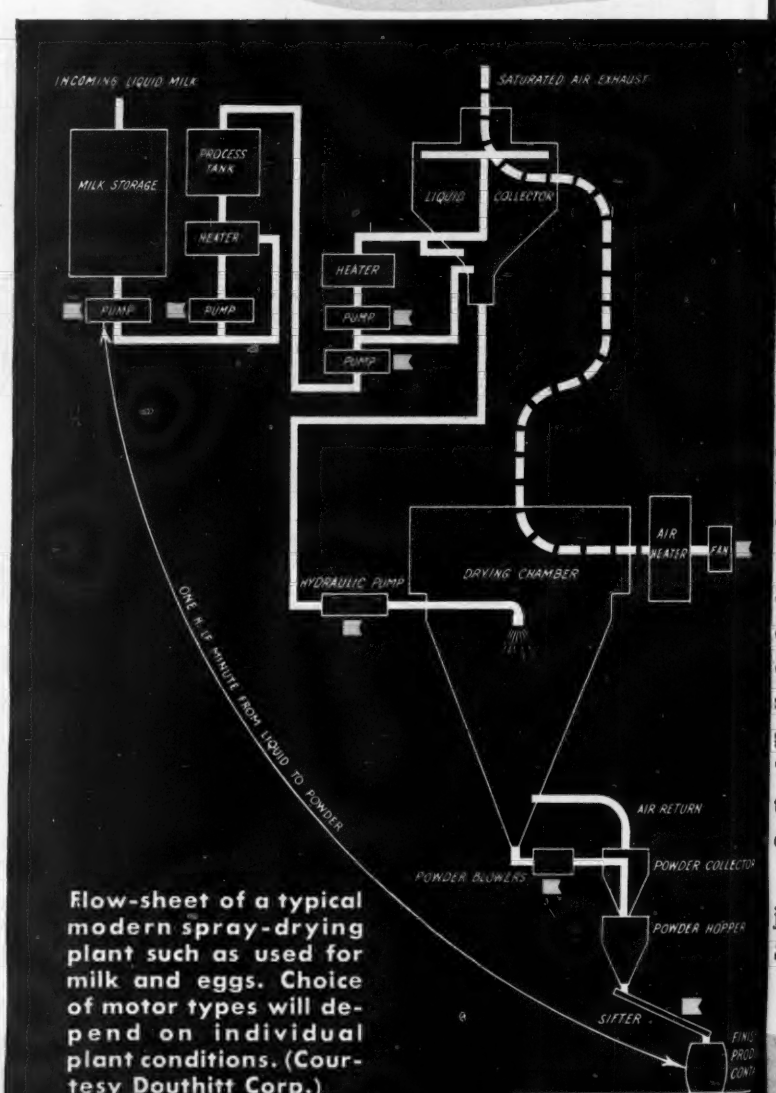
For sanitary milk pumps and other jobs where exposed to steam and wash water. Eliminates the need for protective canopies. Protected against dampness inside and out.

G-E DUST-TIGHT MOTOR

Totally enclosed for maximum safety and cleanliness. Among motors of this type are those listed as explosion-proof by Underwriters' Laboratories for Class II, Group G, conditions (grain dust, etc.).

G-E COMBINATION MOTOR STARTERS

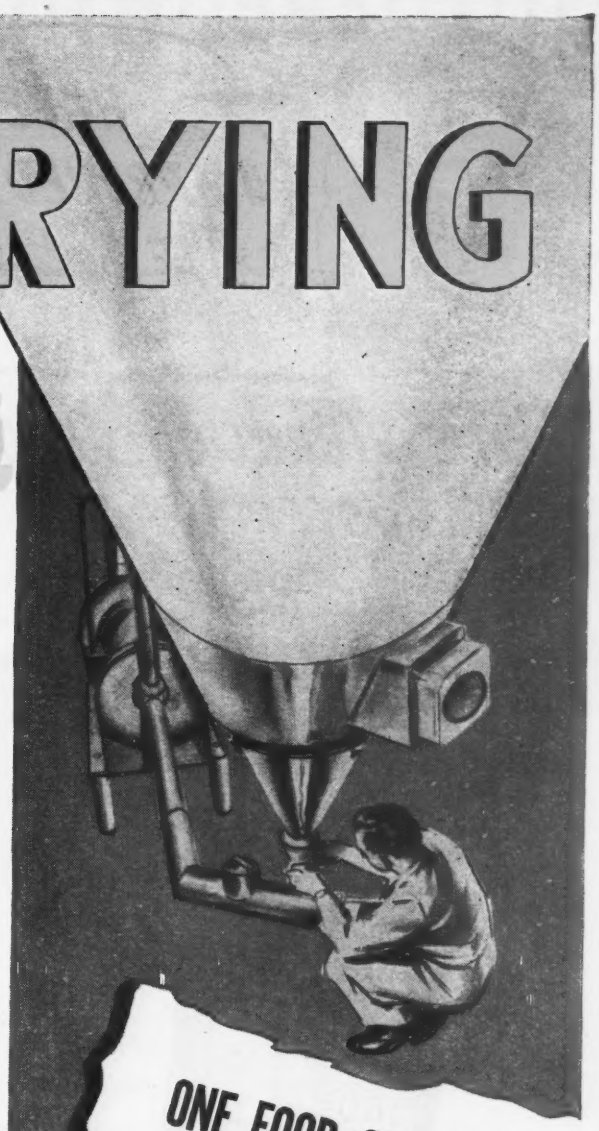
A highly popular control unit that combines motor-circuit switch and magnetic starter in one compact unit. Available in standard enclosures to meet food-plant needs — watertight, dust-tight, etc., as well as in general-purpose enclosures.



Flow-sheet of a typical modern spray-drying plant such as used for milk and eggs. Choice of motor types will depend on individual plant conditions. (Courtesy Douthitt Corp.)

SPRAY DRYING

on Motors and Control



30 SECONDS FROM LIQUID TO POWDER— that's the pace of the modern spray-drying process. Yet in that half minute, a single unit may dehydrate 25 or more quarts of milk or 10 dozen eggs. Pressures as high as 5000 lb per sq in. keep fluids flowing fast through the spray nozzle. From start to finish, electric motors driving a succession of pumps and blowers must keep going, or the entire process comes to a halt. And a shutdown may necessitate a time-consuming "clean-up."

Some of these motors may be exposed to steam or wash water. Others may be required to operate in high temperatures, or in locations where enclosure against dust is essential. Control equipment, too, must be applied for 100 per cent operating continuity, often under unfavorable surroundings.

Whatever the conditions—in spray drying, drum drying, or pan drying—it will pay you to check your plans with G-E engineers. They can help you select motors, control, and other electric equipment that are not only right for the individual spot, but also right as a part of the over-all setup. Thus, you get a well-balanced combination of equipment that must "tie-in" together in service—an ***integrated*** electrical system that is easier to install, easier to maintain, and more likely to deliver full-scale output 100 per cent of the time.

For help on the electrical side of ***any*** essential food processing job, just call your local G-E representative. ***General Electric, Schenectady, N. Y.***

ONE FOOD SHIP DOES WORK OF FIVE

Huge Shipments of Milk and Eggs Move to War Fronts in Powdered Form

Making a vitally important contribution to the shipping problem, America's capacity for drying milk and eggs is now being boosted to new high levels.

By the end of 1943, egg drying will be at the rate of 400,000,000 lb per year—more than six times the 1940 level. Dried-milk production has more than doubled, and an increasing proportion is spray-dried whole milk which can be reconstituted into beverage form for our troops and allies.

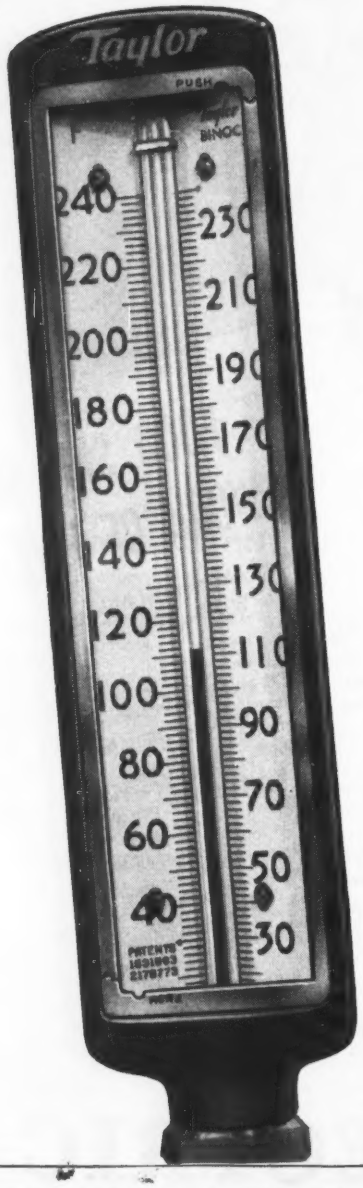
In the production of spray-dried products, all the important nutrients present in the fresh food are retained.

GENERAL ELECTRIC

958-B-110

HAVE YOU SEEN TAYLOR'S NEW IMPROVED INDUSTRIAL THERMOMETER?

IT'S VIBRATION PROOF - PRACTICALLY DUSTPROOF - AND EASIER TO READ THAN EVER!



IT saves tons of bronze for the war effort. Yet this new Taylor Industrial Thermometer is actually *better* in four ways than the pre-war model! Fact is, we planned it before conservation became essential.

1. New Rugged One-Piece Case. Sturdy enough to stand up under any conditions—and looks it!

2. Vibration Proof! No separate front to rattle or work loose. A two-piece interlocking bezel holds the thick glass window against four tension springs fastened with shake-proof screws.

3. Practically Dustproof because of this same tight-fitting construction.

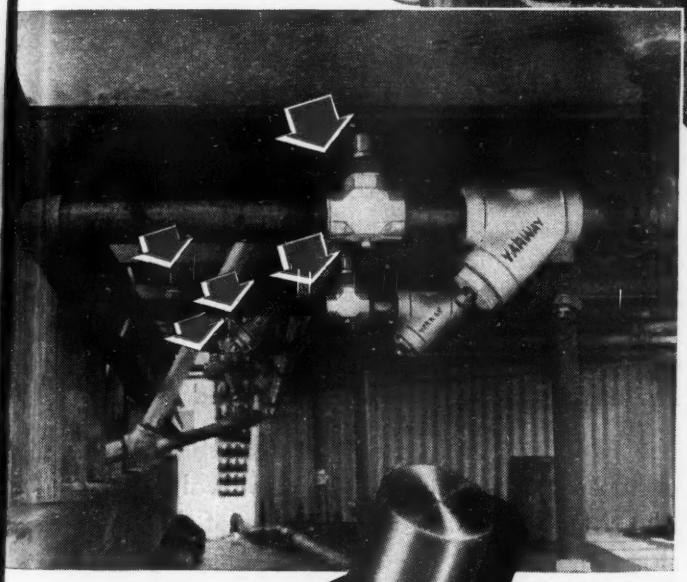
4. Easier to Read Than Ever! Actually *invites* frequent reading because the one-piece case is shallower and the triple-lens BINOC tubing stands out even more vividly, with a wider range of vision than before. Bold, well-spaced scale on sharply contrasting background is *individually graduated* for each tube!

All these advantages, plus *permanent* Taylor Accuracy—the result of artificial ageing to prevent loss of accuracy when in use—make this new Taylor Industrial Thermometer today's best buy! Ask your Taylor Field Engineer, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording, and controlling temperature, pressure, humidity, flow, and liquid level.*

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

★ KEEP ON BUYING U. S. WAR BONDS AND STAMPS ★

Giving Tomatoes a "HOT RECEPTION"



THE C & E Canners, of Hammonton, N. J., have a word to say about Yarway Impulse Traps:—

"Fast cooking is mighty important in our business, so we are highly pleased with the operation of the Yarway Impulse Traps on our tomato pulp cookers. They keep the coils hotter and never give any trouble. Also, they take so little room and are so easy to install. When we need more traps they'll be Yarways."

Solve your trapping problems by standardizing on Yarways. They not only provide *quicker heating; greater sustained heating efficiency; lower installation and maintenance cost; fuel economy* and *saving in valuable floor space;* but they often *cost less* to buy and install *than to repair an ordinary trap.*

See your Mill Supply Dealer or write for Bulletin T-1737.

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia

YARWAY IMPULSE STEAM TRAP

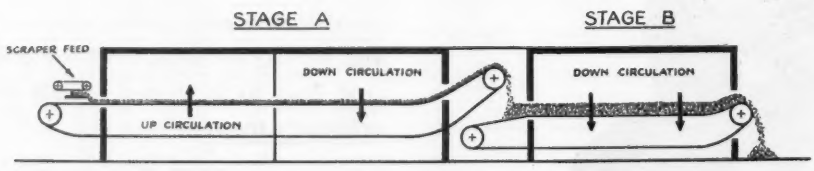
Continuous

Leaders in the food industry have found, through experience, that *continuous operation* and *accurate control* are the keys to ideal food dehydration.

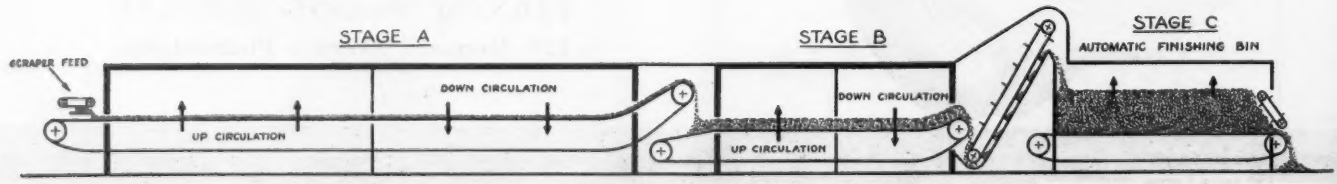
That is why these same leaders are so quick to recognize the many advantages of the PROCTOR Continuous Conveyor Dehydrator. This machine consists essentially of a feeding device; an insulated enclosure where proper temperature and air circulation is maintained for ideal results; a conveying system for carrying foodstuffs through the drying chambers. This system is *entirely automatic in operation.*

The PROCTOR continuous system of dehydration has a great many outstanding advantages over any and all other systems of food drying. Trays, trucks and handling are eliminated in this modern system, which operates continuously with a minimum of supervision. The automatic feeding arrangement insures a uniform flow of food to the machine. A sectional perforated metal plate conveyor fastened to chains carry the foodstuffs through the drying chambers. The chains carry the load so that the plates are subjected to no excessive strain or pull. The sections are hinged together, making a rigid, strong, smooth surface which is kept clean with ease. Air circulation first *up,* then *down* through the bed of vegetables on the conveyor promotes rapid, uniform drying. Dehydrating conditions are accurately controlled and may be quickly changed to suit different food products. PROCTOR Continuous Conveyor Dehydrators are suitable for the correct dehydrating of riced, strip, julienne, diced or cubed potatoes; sliced or diced carrots; diced beets; diced turnips; sweet potatoes; meats and other food products.

The PROCTOR Dehydrator is available in two- or three-stage units to suit individual production requirements. The third stage of the three-stage machine is an automatic finishing zone. With an increase of 75% in the floor space required the three-stage machine gives 100% greater capacity than the two-stage machine.

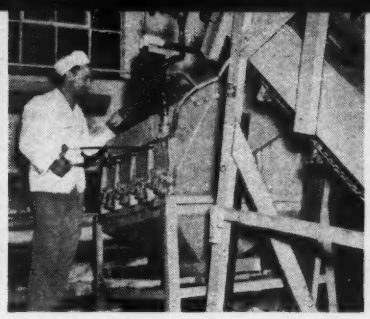


The Two-Stage PROCTOR Continuous Conveyor Food Dehydrator . . . known as the A B Type

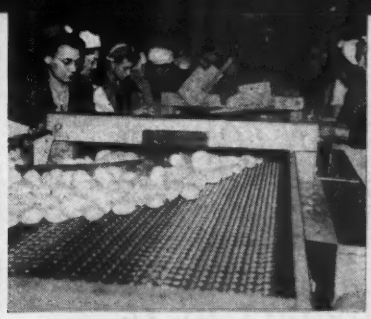


The Three-Stage PROCTOR Continuous Conveyor Food Dehydrator . . . known as the A B C Type

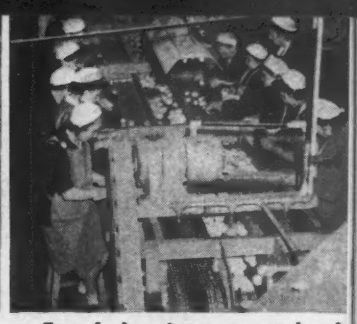
Raw potatoes are loaded, washed and skins loosened



The continuous peeler removes loosened skins

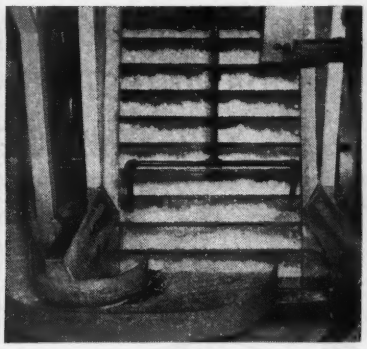


Leaving peeler, potatoes flow onto trimming table



Eyes, bad spots are removed and potatoes are spray washed

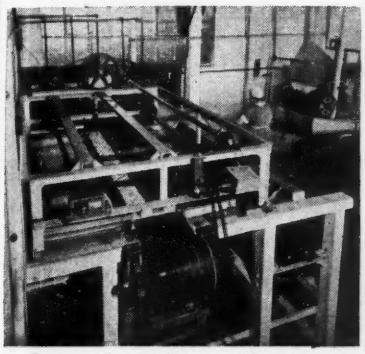
Potatoes, after automatic dicing, pass inspection



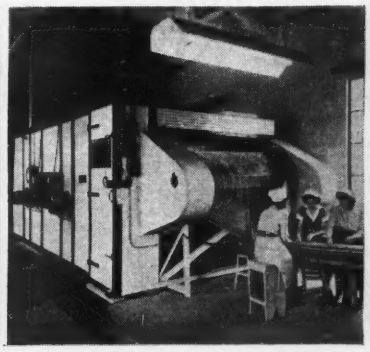
Measuring conveyor assures uniform delivery to dehydrator

Steam inactivates enzymes; insures keeping quality

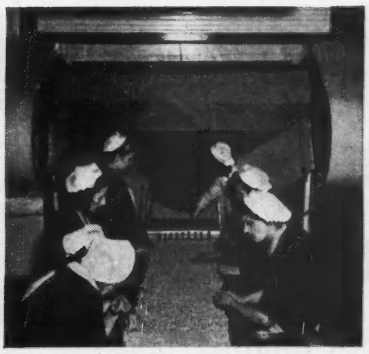
Product drained and conveyed to Proctor Automatic Feed



Scraper feed delivers uniform load to dehydrator conveyor



Proctor Continuous Conveyor Dehydrator delivers product



Product is discharged from machine, passes final inspection

Packaging in moisture-proof containers is speedy, simple

The twelve photographs above show the PROCTOR continuous dehydrating system in operation, as applied to potatoes. These photos are taken from the new 20-page booklet "The PROCTOR Continuous Conveyor Dehydrator". This booklet, which tells in a series of pictures and captions, the complete story of continuous food dehydration, will be sent free on request to dehydrators and food processors interested in dehydration.

PROCTOR & SCHWARTZ · Inc · Philadelphia

PROCTOR

Continuous Conveyor

DEHYDRATOR

PUBLIC LIBRARY

DETROIT MICH.

I KNOW WE CAN CONTROL QUALITY BETTER AS SOON AS WE GET SET WITH THE AIR CONDITIONING WE'VE BEEN HOLLERING FOR

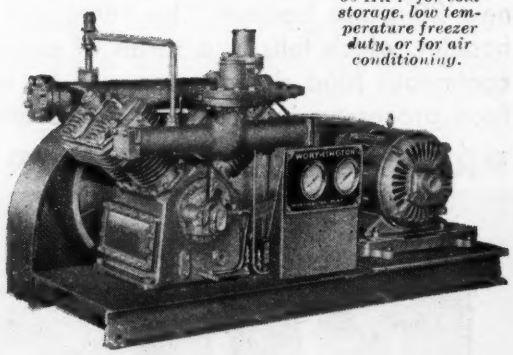
WELL, LET'S GET A WORTHINGTON MAN ON THE JOB AND START ROUNDING UP SOME DEFINITE IDEAS AT LEAST

Everything in Refrigeration . . .

and specialized Engineering Experience to go with it

The immediate problems of a food processing plant can be met, under appropriate priority. Or future installation planning can be matured at leisure. To either Worthington brings consulting advice in any measure required—and a line of equipment second to none. We are, today, specialists in air conditioning in the same all-inclusive way in which Worthington stands out in the pump field. Address: Worthington Pump and Machinery Corporation, Air Conditioning and Refrigeration Division, Harrison, New Jersey . . . Offices also in Principal Cities.

CA 3-29



Worthington Freon Refrigeration Units are available in sizes to 50 H.P.—for cold storage, low temperature freezer duty, or for air conditioning.

WORTHINGTON

Refrigeration

AND AIR CONDITIONING

Out of the Ground Into the Sky!

This good old American soil is on its way out of the ground into the sky to help win this war.

It is Bauxite ore . . . the basic source of aluminum.

Reynolds is digging it out of peaceful hills in Arkansas and, as if by magic, changing it into finished metal. Just when we need it most, *America has a great new independent source of aluminum.*

Experts called it a miracle. But it wasn't a miracle. It was foresight and courage and experience. And even more, it was the skill and the sweat of thousands of Reynolds workers.

Long before Pearl Harbor, Reynolds saw the coming need and staked all its resources to mine Bauxite in America and build mammoth new plants. When war came, Reynolds was ready and rolling with vastly expanded facilities across the country.

Today, Reynolds workers are bringing hundreds of millions of pounds of aluminum . . . *out of the ground into the sky.*

REYNOLDS METALS COMPANY

General Offices: Richmond, Va.
Parts Division, Louisville, Ky.
37 PLANTS IN 13 STATES

POMONA PUMPS STRETCH YOUR PUMPING DOLLAR

MINIMIZE YOUR REPLACEMENTS

Here Is How

POMONA PUMPS CUT REPLACEMENT COSTS

The Same Pomona Handles Different Jobs! Because Pomonas are unusually adaptable, the same Pomona bought for pumping process solutions from a sump or vat, for example, can be easily converted to deep well primary water supply work by simply adding column pipe and shafting . . . or can be converted to line or booster pumping . . . or can even be mounted on a portable frame and used for shaft dewatering or other similar work.

This job-to-job adaptability means fewer new pump purchases with Pomonas!

To this Pomona Industrial Pump . . .

Add column pipe, and you have a Deep Well Pump

. . . or place in the line for Booster Pumping

. . . or mount on an "A" frame for dewatering work!

The Same Pomona Handles Different Capacities: One important reason why a Pomona Pump can be so readily moved from job to job is its ability to handle varying flow requirements *without wasteful throttling.* Its semi-open impellers can be easily adjusted at the motor for regulating capacity over a range to 60% of design point with proportionate power savings. Permits handling widely differing flow requirements without replacing pump or wasting power!

Conventional Flow Pattern

Pomona's Stay on the Job Longer! Pomonas are unique in that the water path through impellers and bowls is free from abrupt changes in direction of flow. Instead, the water rises in a gentle curving flow that reduces friction and abrasion, lengthens life and minimizes replacements. This feature—important in *all* pumping—is particularly vital where unusually gritty or suspension-laden fluids are handled!

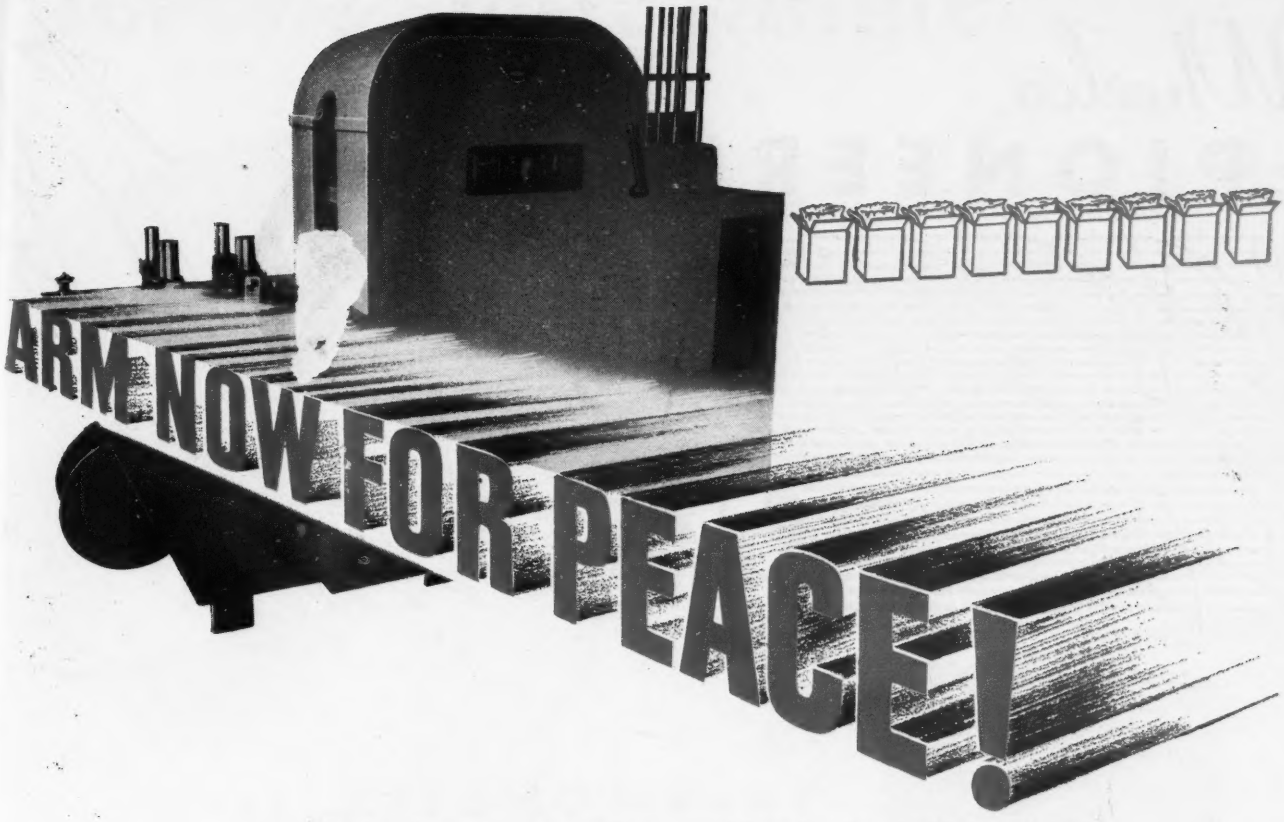
Pomona Flow Pattern

IN ADDITION, Pomona Pumps cut replacements because they are self-lubricated by the fluid being pumped, eliminating risk of neglecting lubrication and damaging pump. They have no wear rings to renew or replace. And the bulbous-end vane shape, besides increasing efficiencies above the 90% mark on many sizes within the range, provides additional strength and longer wearing life to pump bowls, further reducing replacement costs!

There are many other important ways Pomonas cut replacements. Your nearby Pomona distributor will gladly supply full details. Why not call him today?

POMONA
Water-Lubricated
PUMPS

JOSHUA HENDY IRON WORKS
POMONA PUMP CO. DIVISION
120 BROADWAY, NEW YORK CITY
Plants: 4301 So. Spring Ave., St. Louis, Mo.
206 Commercial Street, Pomona, California



Much that we yesterday considered advanced is obsolete. Food packaging for overseas shipments has raised standards of proof against sifting, grease and moisture.

There have emerged with bewildering rapidity, new package designs and shapes, new and more effective materials, new treatments of papers and foils, plastics and thermoplastics.

Tomorrow's packaging machinery will require higher speeds, less floor space, new conceptions of efficiency.

New problems will demand new solutions which our organization will see through from inception to installation.

Do you have future packaging problems—involving perhaps revolutionary ideas which — together — we might now be considering against the day when fulfillment will suddenly be necessary? We should be glad to join you in discussion.

PALMER

CHICAGO

FRANK D. PALMER, INC.

528-34 North Western Ave. • Chicago, Ill. • Chesapeake 3344

PACKAGE DEVELOPMENT LABORATORY ★ SPECIAL MACHINERY MANUFACTURERS

Wheelco PIONEERED....

Electronics in THERMOMETER CONTROLLERS

IN 1939

Again—Wheelco set a standard in Temperature Control

Miracles perhaps—in the terms of higher standards of performance, better quality of production and increased quantity of production — yet, to Wheelco merely experience in applied Electronics.

Since 1935—Wheelco has provided industry with control instrumentation years ahead of the times. The Wheelco "Electronic Principle" introduced practical Electronic application to temperature control, and its combination with a thermometer of improved design provided the low temperature field with the miracles of tomorrow—years before. All lag time between temperature deviation and complete control was eliminated, as were other faults inherent in other types of controllers.

Wheelco's years of Electronic experimentation and application is your gain in the miracles of tomorrow—TODAY!

Wheelco Indicating Therm-otrol

Wheelco Therm-otrols (Thermometer Controllers) combine the Proved-in-Service Superiority of the famous Wheelco "Electronic Principle" Control System with an improved Indicating Thermometer. Control is instantaneous and simultaneous with indicating function. Therm-otrols are available as Indicating or Recording Controllers and may also be combined with Flame-otrol (combustion safeguard), Proportioning Control, Chronotrol (Program Control), or Purging Timers. Supplied with either gas, vapor tension, or liquid fills. Temperature ranges from —50 to +1000° F., or equivalent °C. Described and illustrated in Bulletin Z6200—request your copy without obligation.

Wheelco Instruments Co.

823 W. HARRISON STREET • • • CHICAGO, ILLINOIS

Originator of "Electronic Principle" Temperature Controls

Prevent Valve Failure *before it starts!*

CORROSION CONQUERS ANOTHER VALVE when proper maintenance is neglected . . . . . .

This wedge of an Iron Body O. S. and Y. Gate Valve *should* be still in use, good for many more years of service. Instead, it is worthless, discarded. Unchecked corrosion completely destroyed the threads (1) and the wedge pin (2), allowing the wedge to drop off the spindle and shut off the water supply. Production was stalled several hours, until the trouble was located and corrected.

Analysis of the water conditions when the valve was installed would have indicated the need for a valve made of a metal more resistant to corrosion. But, even with *this* wedge, proper maintenance would have checked the destruction, and prevented the serious interruption in plant operation.

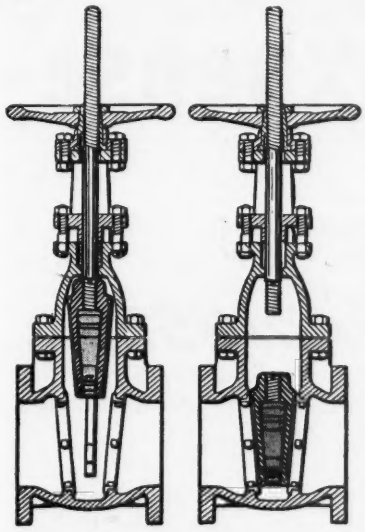
Inspection at frequent intervals would have revealed the excessive corrosion, and measures could have been taken to minimize the ruinous effects, such as water treatment and periodic cleaning. The accumulation of deposit (3) which threatens the eventual destruction of the seat ring (4) would then have been prevented.

This valve failure clearly demonstrates the importance of frequent, systematic inspection, and the repair or replacement of worn parts before a valve destroys itself. It also shows the need for careful selection and proper installation of valves suited to the particular service conditions. If these simple precautions are followed, and maintenance workers are thoroughly instructed, most valve troubles can be prevented before they start.

Interruption in production may have far-reaching effects in the present emergency. It can seriously retard the delivery of material needed by our armed forces. Preventable valve failure is also an inexcusable waste of critical metals. Every management should take all steps necessary to keep valves operating at top efficiency.

Consult Jenkins engineers for any advice you need in improving your system of valve conservation.

Jenkins Bros., 80 White Street, New York, N. Y.; Bridgeport, Conn.; Atlanta, Ga.; Boston Mass.; Philadelphia, Pa.; Chicago, Ill. Jenkins Bros., Limited, Montreal; London, England

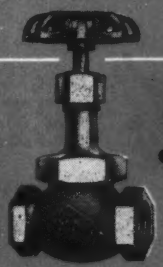


Proper Installation Would Have Minimized Trouble

The valve was installed in the main supply line, in the usual horizontal position, with spindle vertical, and was left open most of the time. As shown in above sketches, the raised spindle indicated that the valve was "open" after the wedge had dropped, and locating the cause of the stoppage was made extremely difficult.

In certain services, where a valve is infrequently operated, it is often desirable to install it with the spindle horizontal. Then, if the wedge should become detached from the spindle, it cannot fall into the closed position.

Army-Navy "E" Pennant, awarded to Jenkins Bros. for high achievement in the production of war equipment.



JENKINS VALVES

For every industrial, engineering, marine and power plant service . . . in Bronze, Iron, Cast Steel and Corrosion-Resisting Alloys . . . 125 to 600 lbs. pressure.

3 simple ways to help avoid trouble and expense—

OIL your equipment regularly (as per oiling instructions given for it) in order to avoid burned out bearings.

CLEAN your equipment. Dust and dirt can do great harm to moving parts — accelerating wear and causing breakdowns.

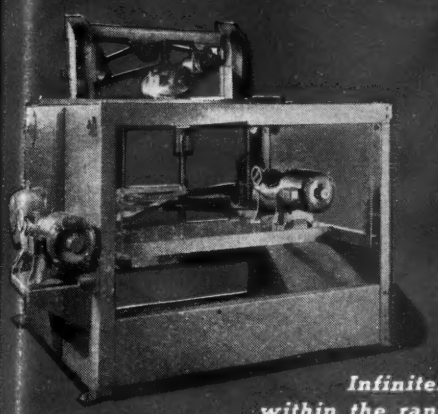
ADJUST belts for tension and alignment. Simple wrench adjustments can prevent needless wear of precious rubber.

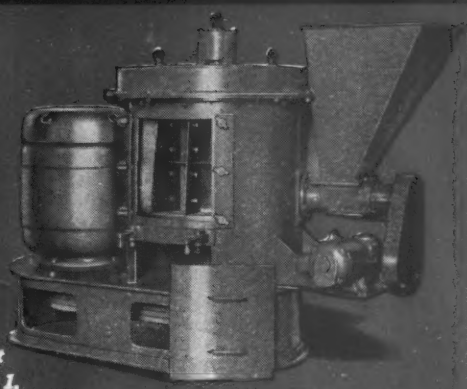
ALL three of these are jobs that your maintenance man can readily attend to. Make sure that they are done regularly—for they will help to prolong the life of your equipment and forestall the need for calling in service men, who are scarce and busy these days. Until after the war, new G-E equipment is obtainable only for war applications...so take the best care of what you have!

General Electric Company, Air Conditioning and Commercial Refrigeration Department, Division 3896, *Bloomfield, New Jersey.*

GENERAL ELECTRIC

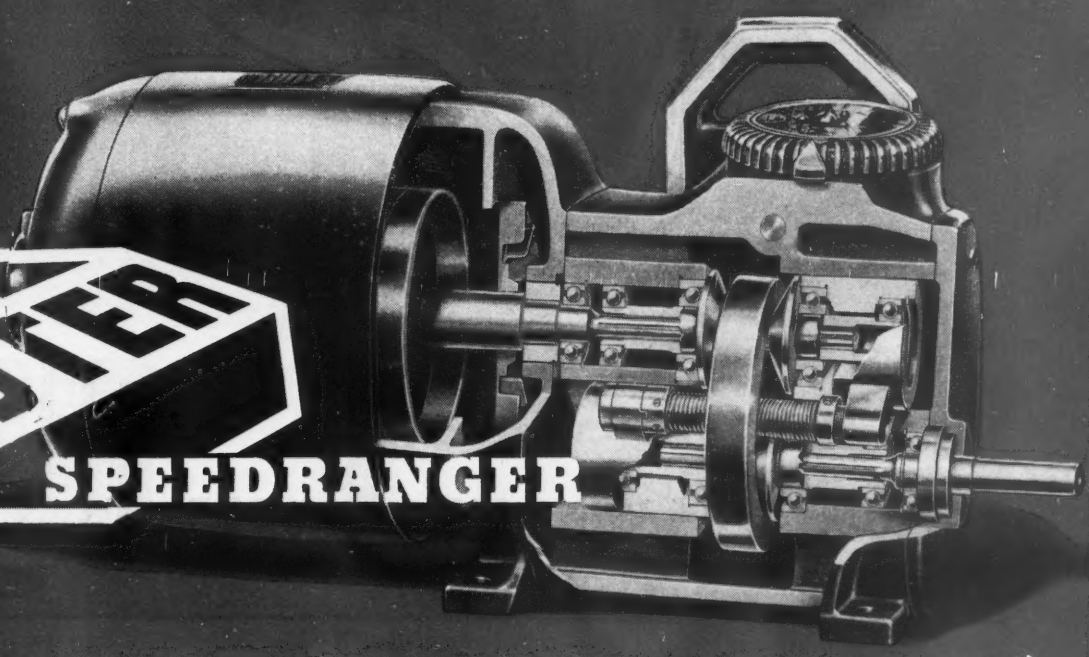
BUY UNITED STATES WAR BONDS AND STAMPS





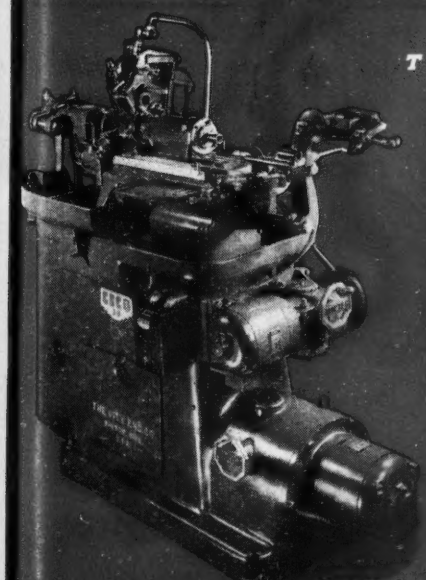
Available in sizes up to and including 3 horsepower in three different speed ranges—3 to 1, 6 to 1 and 9 to 1. Only with an all-metal drive can you secure the compactness, simplicity, flexibility and economy that are so advantageous today.

Infinitely variable speed may be secured to any R.P.M. within the range of the unit. The output speed is increased or decreased by variation of the position of the ring on the two driving and two driven cones.

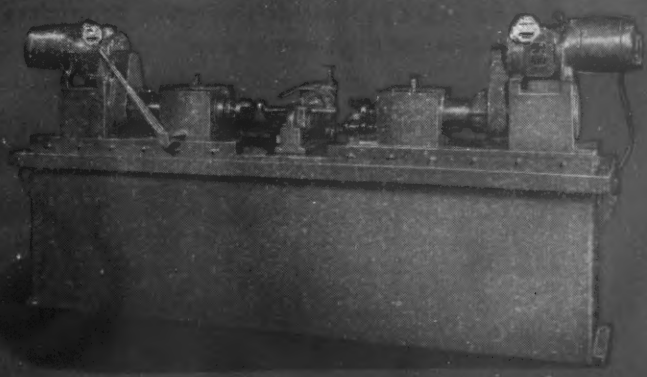


MASTER SPEEDRANGER

THE MASTER ELECTRIC COMPANY • DAYTON, OHIO



Save material and save space with the simple compact, integrally built Master Speedranger. The all-metal construction insures greatest possible durability and freedom from service interruptions.



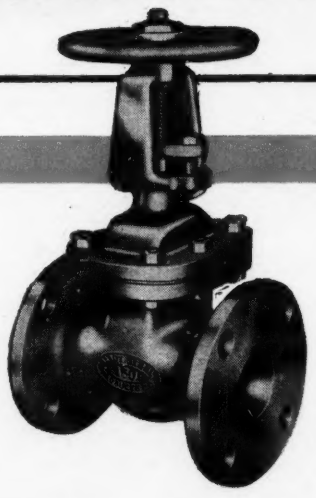
Available in the vast number of types that make up the Master line including the flanged type as shown, also gearhead, unibrake, fan-cooled, explosion-proof, splash-proof, multi-speed, etc.

TEAMWORK WINS THE "E" FOR ALOYCO

■ **On June 17th, officers of the Army and Navy presented the "E" Award to "the Men and Women" of the Alloy Steel Products Company. This honor was won by the untiring energy and devotion to duty of each employee, and to a spirit of loyal cooperation and teamwork among all.**

Our organization is fortunate that the same stainless steel valves we produced for chemical, food and process plants in times of peace were required in large quantities for production of war materiel.

The Men and Women of this Company express their heartfelt thanks for this recognition of their efforts and will not relax in their determination to produce more and more valves until this war is won.



Aloyco Stainless Steel Valves and Fittings . . .

ALOYCO

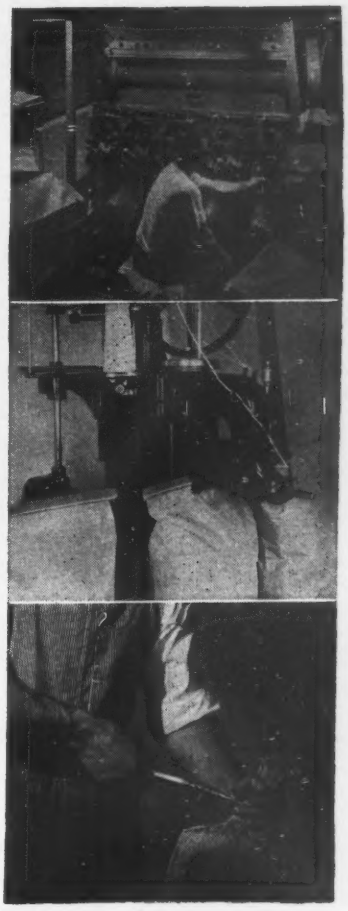
ALLOY STEEL PRODUCTS COMPANY, INC.

1300 WEST ELIZABETH AVENUE • LINDEN, NEW JERSEY

ST. REGIS packaging systems

St. Regis Multiwall Paper Bags are specially designed to protect the product in storage and transit. Special sheets of paper are incorporated in the bag construction to meet special problems such as rough handling, extreme weather conditions, moisture penetration and chemical action.

If you ship in units of 25 to 100 lbs. our packaging engineers will welcome the opportunity to study your packing operation, develop the proper Multiwall Paper Bag for your product and install the most efficient and economical packaging equipment to meet your production requirements. St. Regis Paper Company offers all types and construction of Multiwall Paper Bags and a complete packaging service.



1. *Valve Pack* – automatic valve bag packing machines which weigh a product and force it into the self-closing valve type Multiwall Paper Bag. This operation offers maximum production with a minimum amount of labor.

2. *Sew Pack* – automatic sewing machines for applying an efficient and economical closure to open-mouth bags. This equipment, applying a bound-over tape and a filter cord, sews through all plies of the bag.

3. *Tie Pack* – Where the number of units packed does not warrant the installation of automatic equipment, the wire tie offers an economical and efficient method of closing open-mouth bags. A hand-twisting tool constitutes the entire equipment for effecting the securely tied closure around the neck of the bag.

St. Regis
MULTIWALL
PAPER BAGS

MULTIPLY PROTECTION • MULTIPLY SALEABILITY

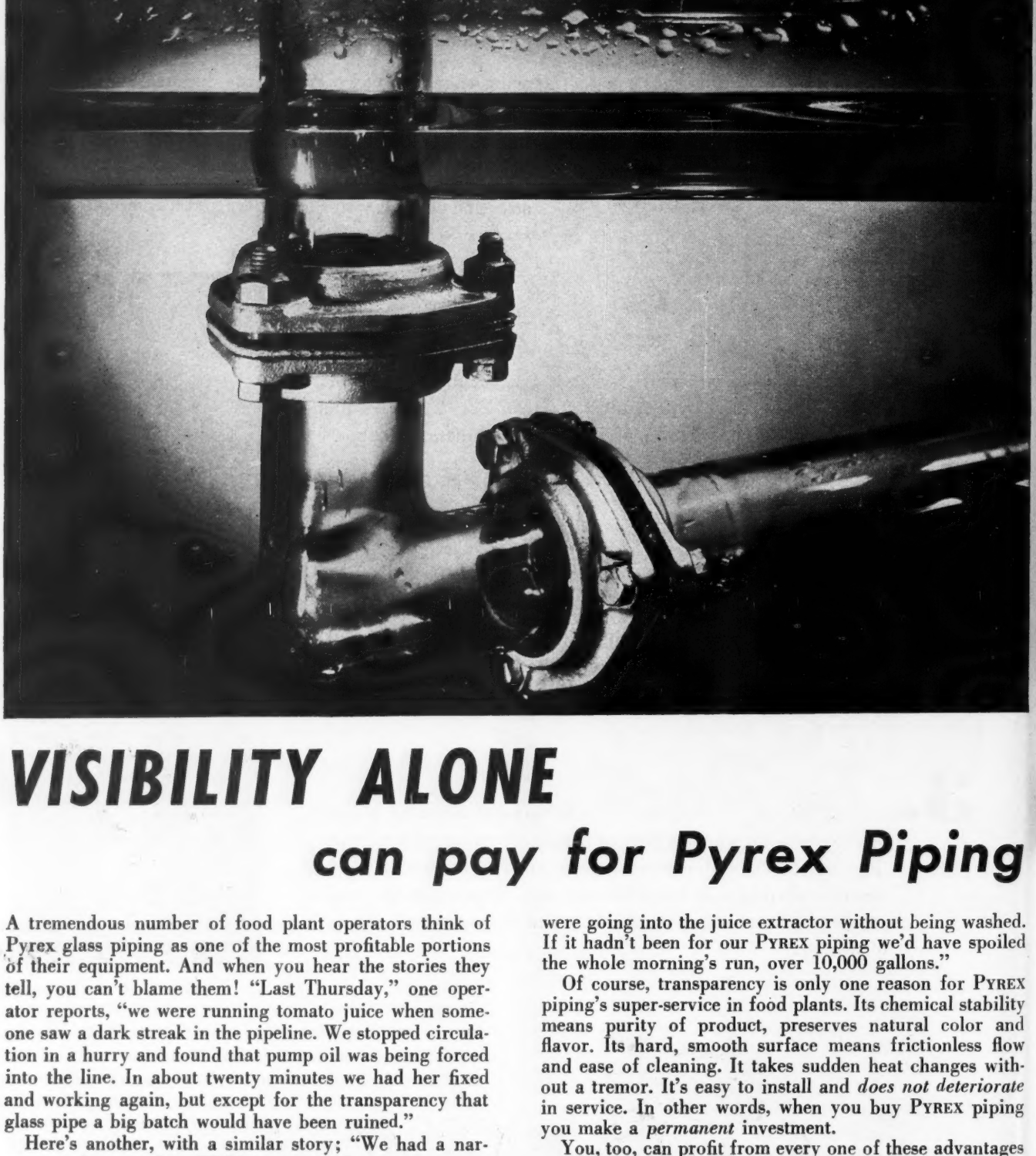
ST. REGIS PAPER COMPANY

TAGGART CORPORATION • THE VALVE BAG COMPANY

NEW YORK: 230 Park Avenue

CHICAGO: 230 No. Michigan Avenue

Offices also at: Baltimore, Md. · Birmingham, Ala. · Dallas, Tex. · Denver, Colo. · Franklin, Va. · Los Angeles, Calif. · Nazareth, Pa. · New Orleans, La. · San Francisco, Calif. · Seattle, Wash. · Toledo, Ohio



VISIBILITY ALONE
can pay for Pyrex Piping

A tremendous number of food plant operators think of Pyrex glass piping as one of the most profitable portions of their equipment. And when you hear the stories they tell, you can't blame them! "Last Thursday," one operator reports, "we were running tomato juice when someone saw a dark streak in the pipeline. We stopped circulation in a hurry and found that pump oil was being forced into the line. In about twenty minutes we had her fixed and working again, but except for the transparency that glass pipe a big batch would have been ruined."

Here's another, with a similar story; "We had a narrow speak yesterday. We'd just started to run tomato juice when I saw black sediment in the pipes. It turned out that through somebody's carelessness the tomatoes were going into the juice extractor without being washed. If it hadn't been for our PYREX piping we'd have spoiled the whole morning's run, over 10,000 gallons."

Of course, transparency is only one reason for PYREX piping's super-service in food plants. Its chemical stability means purity of product, preserves natural color and flavor. Its hard, smooth surface means frictionless flow and ease of cleaning. It takes sudden heat changes without a tremor. It's easy to install and *does not deteriorate* in service. In other words, when you buy PYREX piping you make a *permanent* investment.

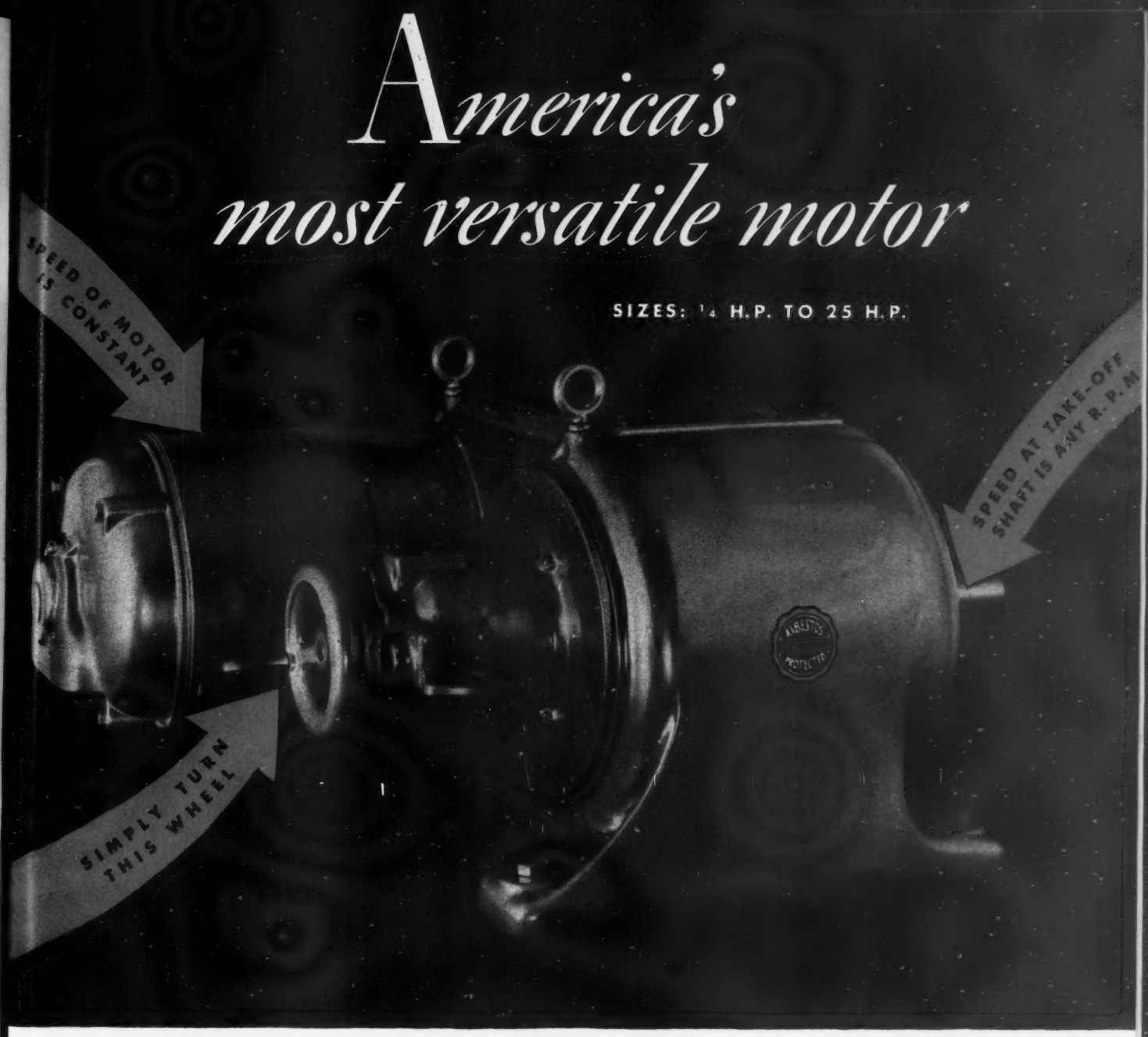
You, too, can profit from every one of these advantages —and now! PYREX piping is not on the critical list. It's available today. Write the Industrial Division, Corning Glass Works, Corning, N. Y.

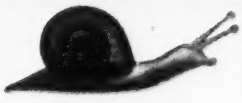
"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

CORNING
Glass Works
Corning, New York

Pyrex Industrial Glass
BRAND

America's most versatile motor





FROM SNAIL'S PACE TO LIGHTNING SPEED

ANY and all speeds over a wide range are offered by the *U. S. Varidrive Motor.* Speed changes can be made while the driven machine is in motion. It gives you power with thousands of speeds. Heretofore it was necessary to equip a machine with extra cone pulleys, belts or cumbersome gear-change mechanism. Now you can have an infinite speed change and built-in motor, all within a neat, compact housing which occupies but slightly more space than an ordinary motor. The Varidrive embodies an electro-mechanical power conversion which changes the fixed, constant speed of the motor element to variable speeds at the take-off shaft without surge or fluctuation. Moreover, the Varidrive embodies the three exclusive features combined only in U. S. Motors,—Asbestos-protected windings, normalized castings and Lubriflush lubrication.

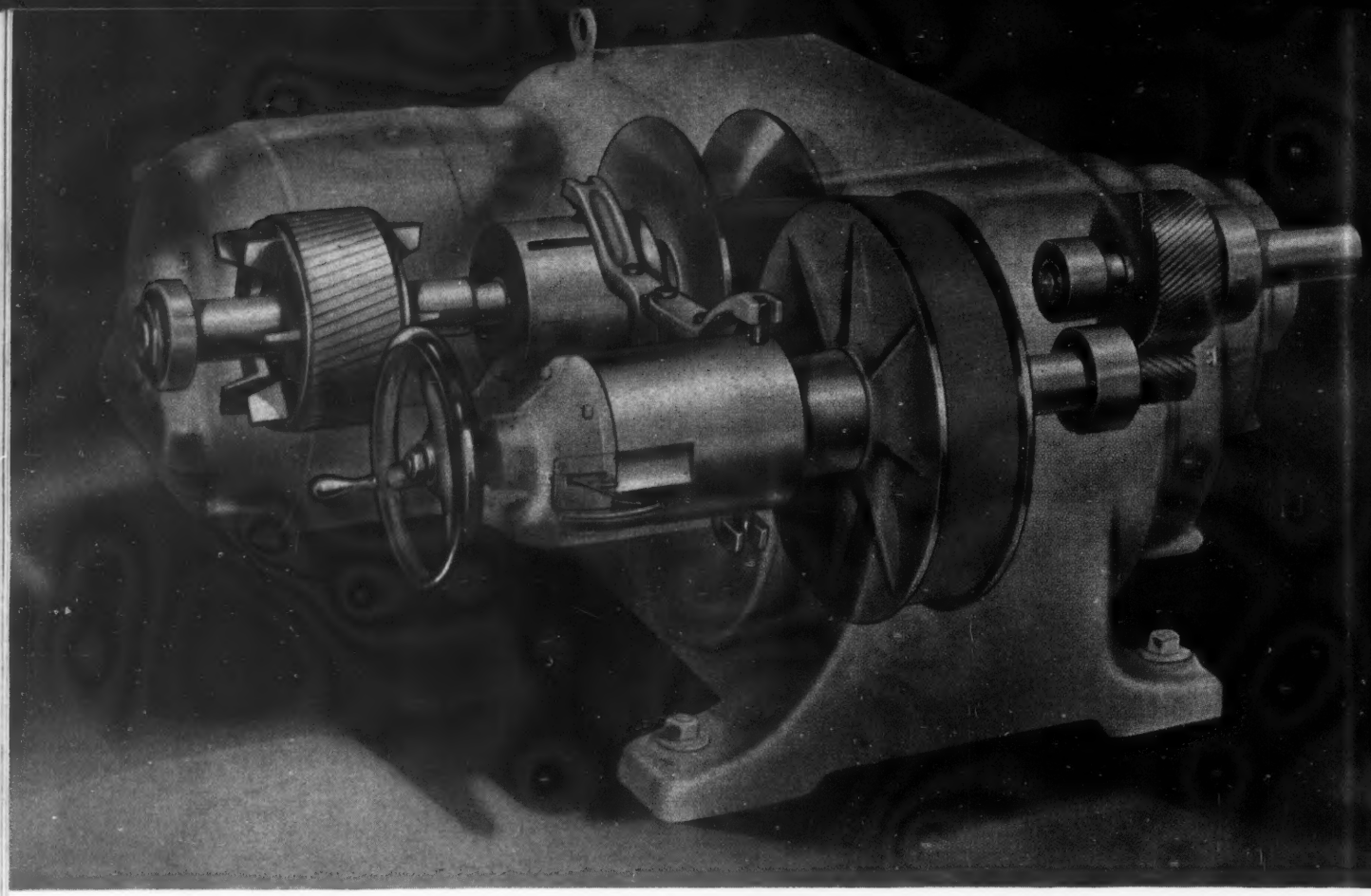
The U. S. Varidrive Motor is available in a wide range of ratings beginning as low as ¼ horsepower. The Varidrive replaces complicated slip-ring motors. It provides the flexible, positive, speed control of direct-current motors without complication of wound armatures, commutators, brush mechanisms and contactors. Quick change can be made from one speed to another, right down to a split r.p.m., while the driven machine is in operation. You merely turn a simple handwheel to make any speed adjustment. Also arranged for remote control. A microspeed Indicator mounted on the case furnishes visual observation of the r.p.m. at the take-off shaft.

U. S. VARIDRIVE MOTOR

FOR INFINITE, SELECTIVE SPEEDS FROM 1 R.P.M. TO 10,000 R.P.M.

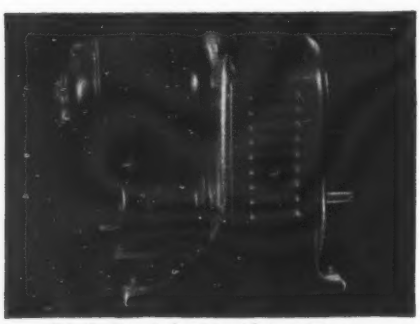
Different types of Varidrives are available to meet the precise requirements of any machine in your plant. Types include Horizontal, Upright and Vertical, with manual or remote control. Combination Varidive-Syncrogear Types give multiplied power at any r.p.m.

IF IT ISN'T A U.S. MOTOR IT ISN'T A VARIDRIVE



CHANGEABLE SPEEDS TO A SPLIT R.P.M.

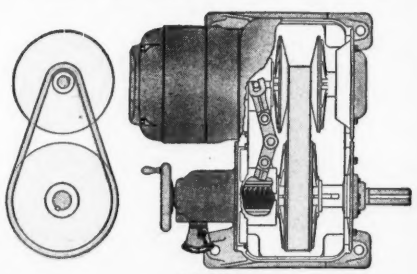
The U. S. Varidrive Motor consists of a simple squirrel-cage motor built integral with a variable speed transmission, as shown in the above diaphanous view of the horizontal type. The transmission comprises dual discs, coupled with a sturdy, flexible Varibelt. Speed is changed by varying the effective driving diameter of the Varidiscs. The two Varidiscs reciprocally expand and contract for higher or lower speeds, transmitting power through the Varibelt to the take-off shaft. To change speed, the operator turns a handwheel. This actuates a traveling hub, which in turn increases or diminishes the distance between the two sides of the driven Varidiscs. *Bulletin upon request.*



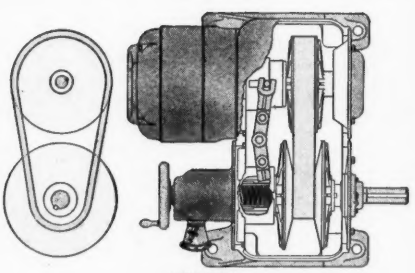
U. S. Upright Varidrive Motor

U. S. Varidrive-Syncrogear Motor

SPEEDS ARE PROGRESSIVELY CHANGED



SLOW SPEED



HIGH SPEED

The QUALITY LINE of Power

VARIDRIVE MOTORS	*for infinite speeds*
SYNCROGEAR MOTORS	*for multiplied power*
UNICLOSED MOTORS	*Horizontal and Vertical*
UNIMOUNT MOTORS	*Horizontal and Vertical*
TOTALLY-ENCLOSED MOTORS	*for hazadous services*
AERO-TEST STANDS	*for aircraft servicing*

AUTOSTART *Grinders and Buffers*

U.S. ELECTRICAL MOTORS Inc.

ATLANTIC PLANT: MILFORD, CONN. • PACIFIC PLANT: LOS ANGELES, CALIF.
Assembly Plant: Chicago. Branches: New York, Boston, Pittsburgh, Philadelphia, San Francisco, Seattle. Agents in all principal cities.

U.S. MOTORS

—embody

ASBESTOS PROTECTION
NORMALIZED CASTINGS
LUBRIFLUSH LUBRICATION

STREAMLINE DESIGN • WEATHERPROOF HOUSING
SOLID DIE CAST ROTORS • INTRACOOLED VENTILATION
AUTOSTART ACTION

AN AMERICAN INSTITUTION WORKING WITH AND FOR AMERICA

UNCLE SAM—WORLD'S LARGEST GROCER

America operates the largest food business the world has ever seen. Upon the packing houses, mills, canneries and other food processing plants in this country, the Allies are depending for the "weapons" that will win the war. To feed the fighters, war workers and civilians in many far-flung countries is a tremendous responsibility. First, to produce food is all-important—second, to conserve and protect it is vital. Waste, shrinkage and spoilage are *enemies* just as surely as the hordes of Hitler, Hirohito and Mussolini. Protective packaging, always important, is doubly critical today. All the expert knowledge and time-tested experience here at America's foremost glassine mills is concentrated into round-the-clock production of these essential papers.

RHINELANDER
PROTECTIVE PACKAGING
Papers

Walter Becker
PRESIDENT
RHINELANDER PAPER COMPANY

FROM THE BEST THAT'S MADE TO THE CHEAPEST THAT'S GOOD

Genuine Greaseproof	Cereal Wrapping Papers	Bakery Product Wraps	Wax Laminated Glassine
Coffee Bag Papers	Laminated Greaseproof Papers	Cracker Box Liners	Opaque Label & Bag Glassine
Confectionery Papers	Lard and Shortening Liners	Greaseproof Innerwraps	Packing Industry Wrappings

RHINELANDER PAPER COMPANY • MILLS AT RHINELANDER, WISCONSIN, U.S.A.

Looking ahead with Asbestos

"...we sure zigzagged that sub dizzy!"

Merchant Seaman Jones talking—and he had plenty to talk about! Skulking periscopes, the white wake of Jap torpedoes, death dancing on every wave; but, boy, the way his ship dodged those long "tin fish"!

A good head of steam; good insulation around pipes and boilers! That's behind all successful sub-dodging; and when Seaman Jones is a civilian again he won't forget that K&M insulation is right on the job, when needed most.

Yes, Keasbey & Mattison 85% Magnesia Insulation is doing an efficient job at sea; and it is also saving heat and fuel—and power—for Industry on land. For in a country at war, power must be conserved and in many plants K&M Insulation has cut the heat loss by 50% or more.

Spurred on by war demands, K&M production of heat insulation is well above its peak in peacetime. Looking ahead with asbestos we are going to keep this new-found production efficiency at work in the "V" years to come.

For only out of full production—and constant research—can come a high standard of living for all, with everyone busy at his favorite work.

* * *

Nature made asbestos;
Keasbey & Mattison, America's asbestos pioneer,
has made it serve mankind . . . since 1873

KEASBEY & MATTISON
COMPANY, AMBLER, PENNSYLVANIA

Makers of

asbestos-cement shingles and wallboards; asbestos and magnesia insulations for pipes, boilers, furnaces; asbestos textiles; asbestos electrical materials; asbestos paper and millboard; asbestos marine insulations; asbestos acoustical material; asbestos packings; asbestos corrugated sheathing and flat lumbers; asbestos-cement pipe for water mains

K&M best in asbestos

TIMKEN BEARINGS HELP PREVENT FOOD WASTAGE

Food processing machinery needs Timken Tapered Roller Bearings as much as any other kind of equipment; more than some, for in addition to the friction elimination, the safe carrying of radial, thrust and combined loads and preservation of alignment of moving parts, it is vitally necessary that product contamination be prevented.

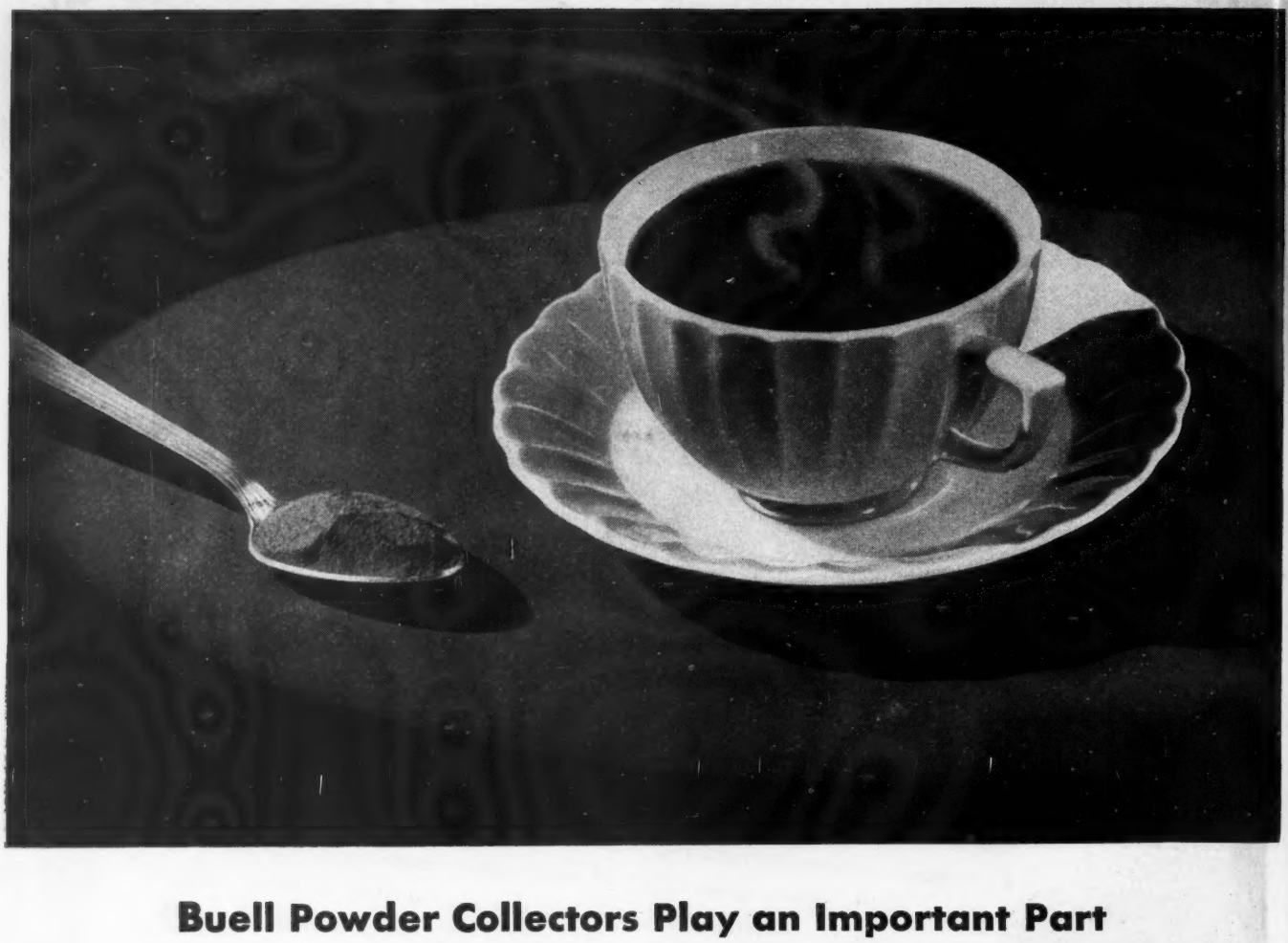
When Timken Bearings are used there is no danger of lubricant leakage because the design of the bearings and the manner in which they are mounted enable them to be sealed so effectively.

Increased speed, reduced maintenance and prevention of food loss through contamination give users of Timken Bearing Equipped machines a considerable advantage by holding production at a consistently high level—and thus helping to bring Victory closer. The Timken Roller Bearing Company, Canton, Ohio.

Keep going for Victory—but don't wait to see what will happen afterwards; redesign your equipment to overcome any competitive challenge—and install more Timken Bearings.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

IN MAKING THE *Coffee* YOU MAKE IN YOUR CUP



Buell Powder Collectors Play an Important Part

Add instant coffee to the growing list of dehydrated products to whose processing Buell Powder Collectors are bringing new efficiencies and economies.

Here, as in the dehydration of eggs, milk, soups, citrus juices, and other products, Buell Powder Collectors are an essential part of a proper spray drying system—assuring virtually 100% recovery of powder that would otherwise be lost in the exhaust. In many instances, savings effected through recovery of material quickly pay for the cost of installation.

Buell Powder Collectors specially designed for food processing are made of special metals to meet all Pure Food requirements. Corners are rounded to prevent lodgement of material, and an ingenious hinged construction facilitates take-down for easy cleaning.

The high efficiency of Buell collectors is due to the patented van Tongeren cyclone—an exclusive Buell feature. Buell Powder Collectors have no moving parts, require little or no attention, will not clog, and cost little to operate.

Write for factual 28-page book "Bulletin G-842"

BUELL ENGINEERING COMPANY, INC.
Suite 5000, 8 Cedar Street, New York
Sales Representatives in Principal Cities

BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST

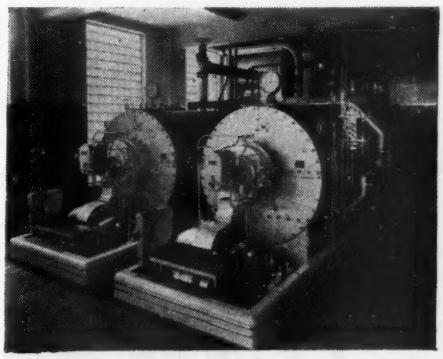
CONSULT BUELL *First* IN DUST RECOVERY
for Chemical • Rock Product • Metallic • Food • Flue or any other dusts

buell
POWDER RECOVERY SYSTEMS

. . . YOU'RE LOOKING AT THE INSIDE "REASON WHY" CLEAVER-BROOKS STEAM GENERATORS GET ALL POSSIBLE HEAT FROM FUEL

The basic reason for the high thermal efficiency and low fuel costs of Cleaver-Brooks Steam Generators is graphically shown above.

The remarkable thermal efficiency of more than 80% of a Cleaver-Brooks Steam Generator is accomplished by the original and exclusive Cleaver-Brooks four-pass, down-draft construction of the boiler.



Showing two 300 HP. Cleaver-Brooks Steam Generators as installed at the Downing Box Co., Milwaukee. Note compactness and entire absence of breeching and feed-water piping — all piping concealed in pits below floor level.

Note the four complete passes of combustion gas travel through the entire tube length of the boiler proper, with the fourth and last pass at the bottom, assuring equalized stress over the entire shell surface.

It is these extra economizer passes which enable the boiler to absorb the greatest practicable amount of heat from the fuel burned. With a Cleaver-Brooks Steam Generator exhaust temperature is only 125° above that of steam and water in the boiler; CO_2 analysis is not less than 14%.

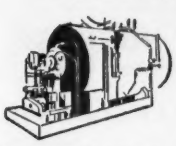
Quick steaming capacity — minimum man-power needed for operation and maintenance — cleanliness, no smoke, ashes, clinkers — compact, space-saving design — simple, low-cost installation — dependable performance — these are all added advantages of a Cleaver-Brooks Steam Generator.

Get complete information now—for the future — on Cleaver-Brooks Steam Generators — sizes 20 to 500 HP.; pressures 15 to 200 lbs.

CLEAVER-BROOKS COMPANY
5103 North 33rd Street Milwaukee 9, Wisconsin

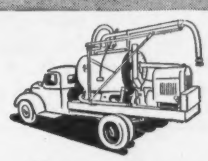
Cleaver-Brooks STEAM GENERATORS

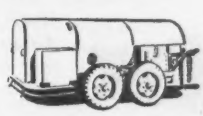
CLEAVER-BROOKS PRODUCTS INCLUDE:


Steam Generators

Food Dehydrators

Tank Car Heaters


Bituminous Boosters


Special Military Equipment

Somewhere south of the equator a sturdy 1-ton Mack does ground duty for one of Pan American Airways' famous flying clippers . . . Sketched by Peter Helck.

LITTLE CHIP OFF A RUGGED OLD BLOCK . . .

You don't have to work long with trucks—either as owner or driver—to see why the admiring phrase, "Built like a Mack truck" has established itself in America's language. On the heavy punishing jobs it has been known for years that a Mack's your *best* truck in the end because it's *more* truck to begin with. The performance of little Mack pick-up and delivery trucks in wartime transportation is proving that every Mack, no matter what size, is truly a chip off the old block.

Mack Trucks, Inc., Empire State Bldg., N. Y. C. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J. Factory branches and dealers in all principal cities for service and parts.

Mack

TRUCKS

FOR EVERY PURPOSE

ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY...IF YOU PLAN TO GET ONE, YOU'RE WISE!

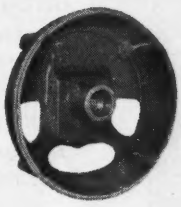
RIGIDITY

Keeps Century Motors a-runnin' under heavy shocks and vibrating loads

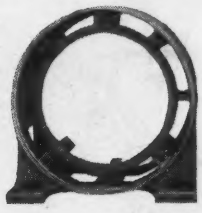
Century MOTORS

Five features of Century design combine to assure freedom from distortion — freedom from noise — perfect alignment.

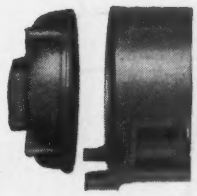
1 The feet are cast as part of the motor frame with machined mounting surfaces providing for a firm attachment and alignment, essential when the motor is incorporated as part of precision equipment.



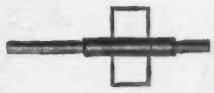
2 Rigid curved end-brackets are braced for permanent alignment of bearings to maintain a concentric magnetic field, essential to uniform characteristics and quiet operation.



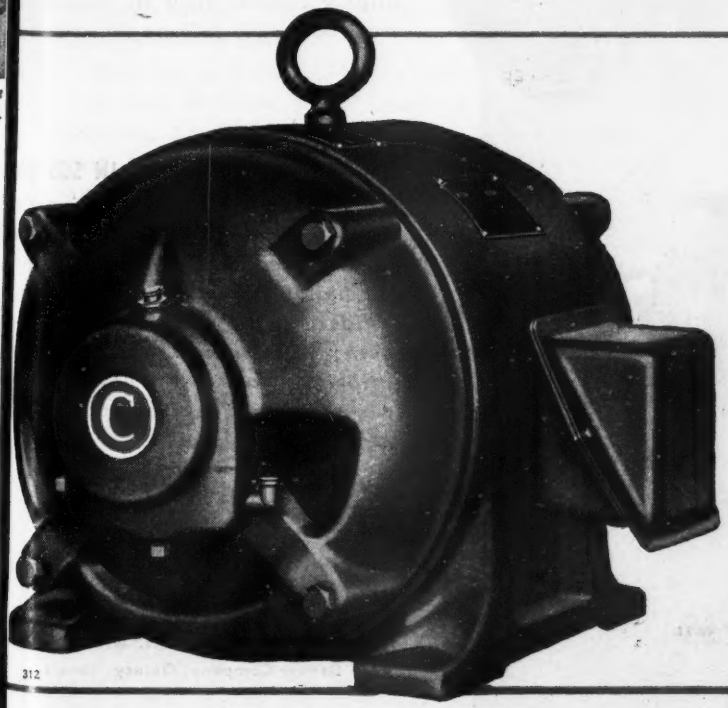
3 Heavily ribbed cast iron frame holds the stator laminations in place — they are locked under pressure — they cannot shift position — the air gap is maintained.



4 A machined bead with close tolerance on the end-bracket fits inside a similarly machined surface on the motor frame — this accurately and permanently aligns the bearings in relation to each other and to the motor frame.



5 The rigid steel shaft is larger in diameter through the rotor which prevents deflection — protects against bearing wear.



Thus, when a Century Motor is bolted to a machine or foundation, you can expect uniform and quiet operating characteristics to be maintained for continuous service, 3-shift operation.

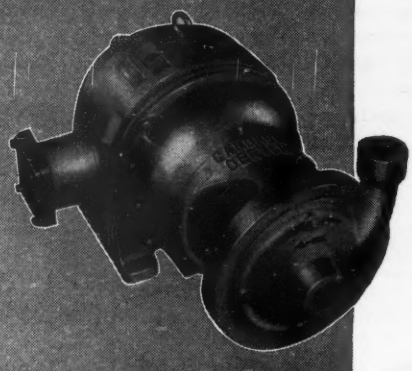
Your Century Application and Service Engineer will gladly tell you all of the advantages of Century Motors — help you select the *correct* Century Motor for practically any application, from fractional to 400 horsepower.

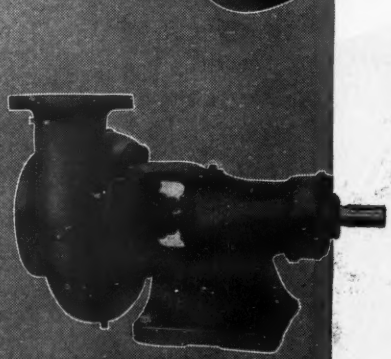
CENTURY ELECTRIC CO.

1806 Pine Street St. Louis, Missouri

Offices and Stock Points in Principal Cities

One of the Largest EXCLUSIVE Motor and Generator Manufacturers in the World





TODAY—when all wartime equipment is giving its utmost—Gardner-Denver Centrifugal Pumps are proving the worth of their advanced design—are delivering extra gallons at lower power cost. And the wartime records of these truly modern centrifugal pumps are writing a tip for tomorrow's pump installations—when extra pumping efficiency will be equally in demand.

GARDNER-DENVER

Since 1859

FOR LARGE CAPACITIES AND HEADS UP TO 350 FEET—*Gardner-Denver Horizontally Split Case, Double-Suction Centrifugal Pumps are ruggedly constructed for heavy-duty service. Large, smooth waterways prevent eddies and cross currents. Horizontally split casings permit easy access to rotating element without disturbing pipe connections.*

COMPACTNESS AND SIMPLICITY OF DESIGN—*The shaft, impeller and bearings are the only moving parts of Gardner-Denver Side-Suction Centrifugal Pumps. Efficiently designed water channels and impeller blade angles. Designed for low-cost, general utility service—built in capacities from 5 to 1600 gallons per minute.*

COMPLETELY ASSEMBLED AND READY FOR USE—*Gardner-Denver Close-Coupled Centrifugal Pumps are assembled as a compact unit that may be installed in any position on the floor, wall or ceiling. Water passages and impeller blades are carefully proportioned and thoroughly tested. Built in capacities from 30 to 1200 gallons per minute.*

HANDLES PULP OR SOLIDS IN SUSPENSION—*Gardner-Denver Horizontal Non-Clogging Centrifugal Pumps are designed for waste disposal and for handling any fluid containing solids or stringy substances in suspension. Designed with accurate impeller blades and casing passages—may be easily adapted to fit special applications.*

For complete specifications, write Gardner-Denver Company, Quincy, Illinois

Sealing the last-minute sting in a bomb

A "block buster" bomb is harmless . . . until someone opens a "tin can."

This can contains the bomb's sting —a fuse. Without it no bomb can explode. At the last minute before a raid, the fuse is taken from the can and shoved into the nose of the bomb.

This fuse has to be *right* when it goes into the bomb. That's why it's packed in a can.

A damp fuse could turn a costly bomb into a worthless dud. But the "bomb fuse" can, moisture-proof and air-tight, keeps each fuse safe and dry until it's needed.

Vital materials like this are riding off to war by the millions in America's favorite container. They — and the can—are working for American boys, helping them do a job and come out on top. The essential things you get in cans—food, fuel, medicine—are also going to the fighting fronts in cans.

Cans are tough. They don't break, chip or tear. They protect against water, dirt, light, insects. Things get there—*safe*—in cans.

The can that goes to war today will be back again . . . guarding the things *you* depend on. It'll be better than ever, thanks to the experience we're gaining as packaging headquarters for the boys in uniform.

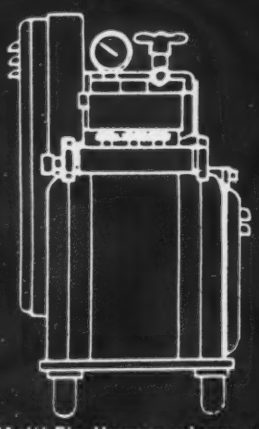
CONTINENTAL CAN COMPANY

NOTE
TO WAR MANUFACTURERS

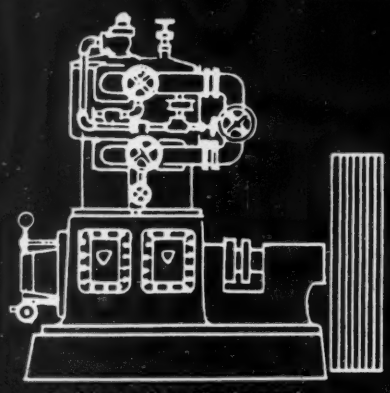
Metal containers are delivering the goods *safely*—foods, supplies, and bullets arrive ready for action. Continental is making millions of these cans along with other war needs, including plane parts.

Yet, rushed as we are, we can still take on more! Right now, a part of our vast metal-working facilities for forming, stamping, machining and assembly is still available. Write or phone our War Products Council, 100 East 42nd Street, New York.

HELP CAN THE AXIS—BUY WAR BONDS



Multi-Flo Homogenizers and
Hi-Pressure Sanitary Pumps



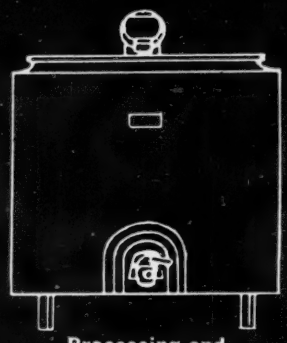
Refrigeration Equipment
for Quick Freezing

EQUIPMENT *Available*

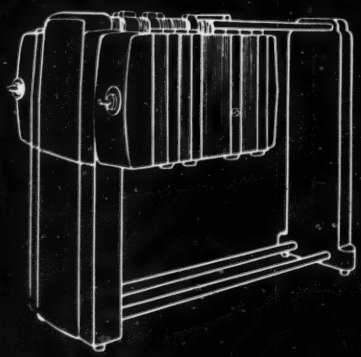
● While most of our manufacturing facilities are now concentrated on the job of producing fighting tools for Uncle Sam... Food Processors will find CP able to provide reasonably prompt delivery of equipment with proper priority.

CP's half century of experience in the design and fabrication of equipment for the Food Industry . . . in sanitary improvements . . . in the development of pasteurizers, homogenizers, pumps, sanitary fittings, heaters, coolers and complete refrigeration... enables us to analyze current conditions and requirements, and to provide time-saving and labor-saving setups for egg processing plants, powdered milk plants and processors of many other vital food products.

Wire, phone or write the nearest CP Branch for full particulars.



Processing and
Storage Tanks



Tubular and Plate
Heat Exchangers

CP SUPPLY LINE INCLUDES:
Damp-Tex Paint
Emery Aggregate Floors
Brushes • Gaskets
Cleaning Compounds
Lard Tubs
Blitzbug Insect Spray

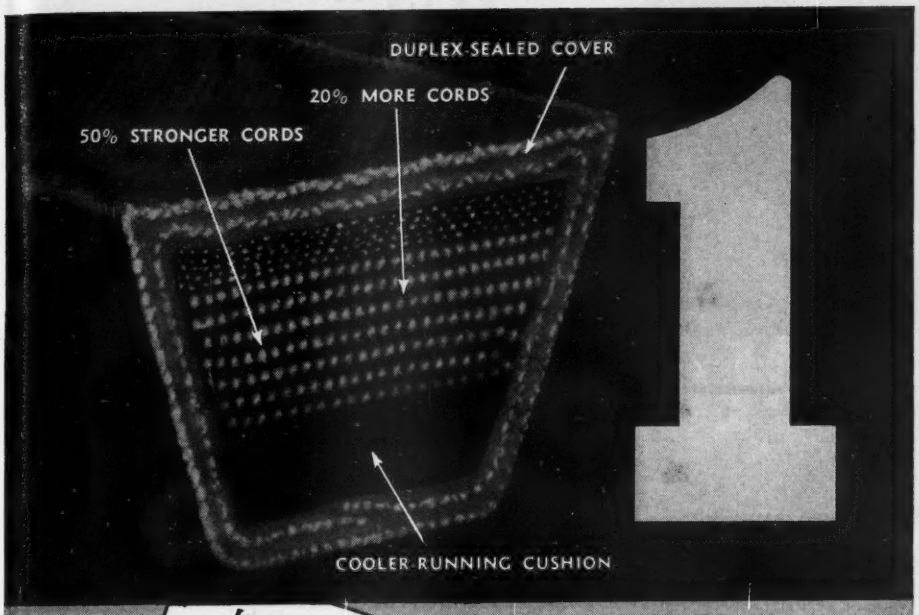
Creamery Package

THE CREAMERY PACKAGE MFG. COMPANY, 1243 W. Washington Blvd., Chicago, Ill.

Branches: Atlanta — Boston — Buffalo — Chicago — Dallas — Denver — Kansas City
Los Angeles — Minneapolis — New York — Omaha — Philadelphia — Portland, Oregon
Salt Lake City — San Francisco — Seattle — Toledo — Waterloo, Ia.

CREAMERY PACKAGE MFG. CO. OF CANADA, LTD.
267 King St., West, Toronto, Ont., Canada

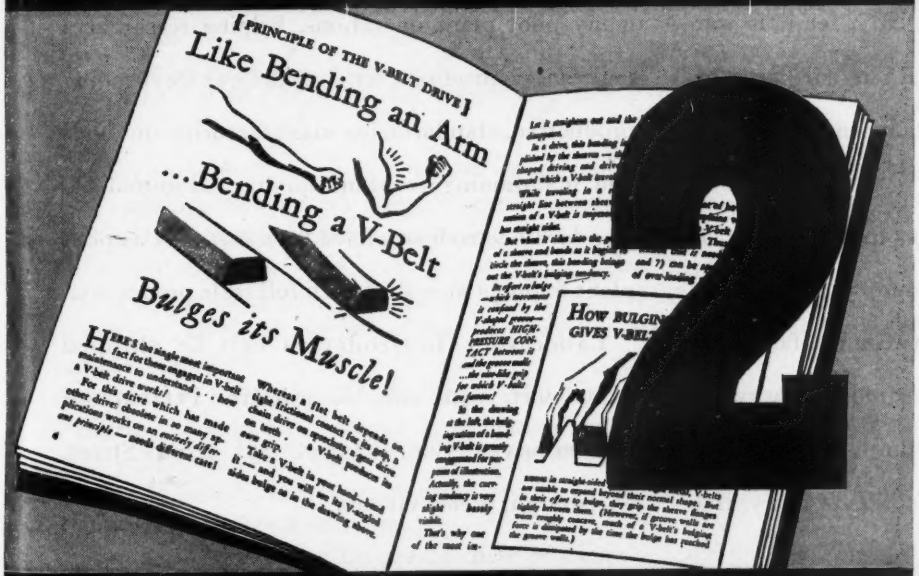
PUT THE Brakes on V-Belt Wear (DO IT TWO WAYS)



1

BUY THE BEST BELTS. .

You'll find design-against-wear at its finest in Texrope Super-7 V-Belts! 20% more pulling cords — each *50% stronger*, thanks to the New Flexon Process — combat stretching, give Super-7's extra power and durability. Cords are eased around sheaves on a shock-absorbing cushion of special cool-running rubber that combats flexing heat, enemy of V-belts. Tough, new Duplex-Sealed cover protects inner belt structure. When you do need new belts, *invest in the best* — Texrope Super-7!



2

USE THE BEST CARE. .

Whatever brand of V-belts you are now using, you can make them last *longer* by following the tips in Allis-Chalmers' free handbook: Plain Facts on Wartime Care of Rubber V-Belts." Typical contents: how V-belt anatomy affects maintenance . . . good rule-of-thumb for tension . . . seven dead V-belts and what killed them. Packed with practical data, fully illustrated, the new handbook is specially suited for training new men. Tear off the coupon below and send for this valuable new handbook today!

ALLIS-CHALMERS

TEXROPE* SUPER-7 V-BELTS

WE WORK FOR VICTORY — WE PLAN FOR PEACE

*Trade mark registered U. S. Patent Office. Texrope Super-7 V-Belts are the result of the cooperative research and design genius of two great companies—Allis-Chalmers and B. F. Goodrich—and are sold exclusively by Allis-Chalmers. Available in all sizes.

ALLIS-CHALMERS MFG. CO.
Milwaukee, Wisconsin
Gentlemen:
Yes, I would like to receive free of charge a copy of your "Plain Facts on Wartime Care of V-Belts".

(Name) _____

(Title) _____

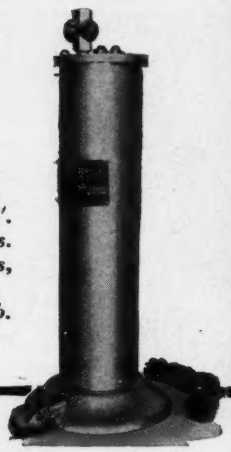
(Company) _____

(Street Address) _____

(City and State) _____ A-1605

Meet our Star Salesman,

THE LABORATORY LECTRODRYER



Size—10"x 13"x 26".
Shipping weight—40 lbs.
Electric load—450 watts, 110 volts AC or DC.
Price—$120.00 net, f.o.b. Pittsburgh, Pa.

The "Laboratory model" Lectrodryer is on dozens of important production jobs. The work can't be described here—Censors say "No", for it is war work—but each machine is DRYing air, gases or liquids just as efficiently and dependably as its big brothers.

This Lectrodryer is working, too, in plenty of laboratories throughout the country. It is teaching students the difference between old-fashioned hit-or-miss methods and the modern way of working with materials of definite dryness. The war effort is aided as these students carry this knowledge into industry.

And the Laboratory Lectrodryer is serving in many pilot plant operations, helping researchers perfect their products. It points the way for speeding production, standardizing manufacturing methods and maintaining constant quality. Hundreds of standard Lectrodryers have been installed as pilot plant findings were shifted to full scale production.

Laboratory Lectrodryers can be shipped from stock with suitable priority. PITTSBURGH LECTRODRYER CORPORATION, 301 32nd Street, Pittsburgh, Pennsylvania.

LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

PITTSBURGH
LECTRODRYER
Reg. U.S. Pat. Off.
CORPORATION

An "Envelope" changed all that!

"Report for new rifles!"... and you hunted up rags and kerosene and spent the next few hours washing off the thick grease... getting ready for that stiff inspection. Yes, that was in 1918, before protective packaging came to the rescue.

Today, the rifle is *out of the package and into the fight!* The rifle is coated with a light oil and inserted in a tough, triple-ply moisture-proof "Boot" or sleeve — really an envelope... This is just one of the many ways in which packaging is directly serving the war effort.

You'll find U. S. E. Envelopes protecting sulfa-drugs, sutures, salt and salt tablets, toilet paper, field rations... serving as containers for dehydrated food, small parts, shipping papers, humidity indicators..."boots" for rifles, and carbines, case liners for overseas shipments, and moisture-vapor-proof — waterproof — grease-proof containers for many ordnance materials.

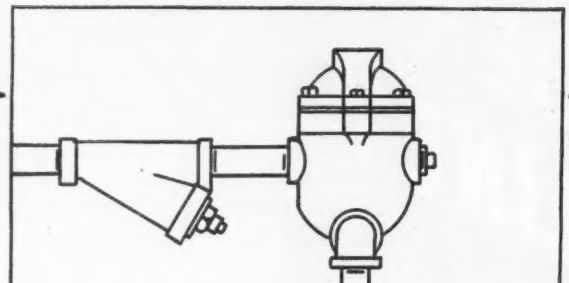
The long experience that has solved these problems is ready to serve you today in your packaging needs for war... *and afterward.*

UNITED STATES ENVELOPE COMPANY
Container Division
SPRINGFIELD, MASSACHUSETTS

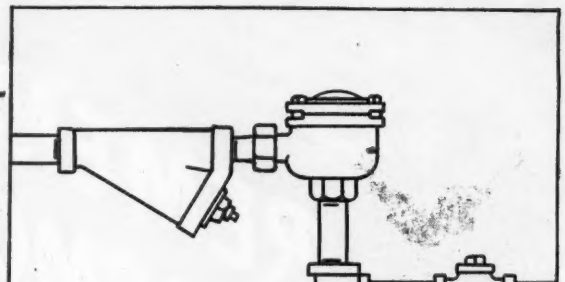
U★S★E *protective packaging*

Products of United States Envelope Company include: WAR PRODUCT PACKAGING • TRANSPARENT CONTAINERS • ENVELOPES
WRITING PAPER • LINWEAVE PAPERS • NOTE BOOKS • PAPER CUPS • TOILET TISSUE • PAPER TOWELS

What a production man needs to know about Traps for DEHYDRATION



Method of connecting Webster Series "79" Float and Thermostatic Trap and Strainer.



Method of connecting Webster Series "78" Thermostatic Trap and Strainer.

Take a fast-drying vegetable like cabbage . . . Or take a slow-drying vegetable like sweet potatoes . . .

In either case, failure to drain equipment properly slows the drying process. Increases production costs.

It takes quick, positive and complete elimination of air and condensation from steam coils to maintain a uniform drying rate.

With Webster Steam Traps, your drying cycle is protected. Steam chambers are cleared continuously and automatically of air and condensation. Output is stepped up.

Webster Traps hold steam in the heating coils or drum dryers until it has given up all of its useful heat. Help to keep your costs in line by preventing needless fuel waste.

You'll like Webster Steam Traps for maintenance, too. Built to last of finest materials. Easy to repair when long use makes thermostat inoperative. A new thermostatic assembly can be quickly installed in the original trap body. No need to disturb piping.

Your nearest Webster Representative will gladly give you the facts about "protected drying" with Webster Steam Traps. Call him today or write us direct for Webster Process Steam Trap Data Book, Bulletin B-1200E.

ARMY E NAVY

Webster Steam Heating

WARREN WEBSTER & COMPANY, CAMDEN, N. J., EST. 1888

Representatives in principal U. S. cities : : : In Canada, Darling Brothers, Ltd., Montreal

YOUR 5 MINUTES' READING *May Help His Fighting*

When you take a few minutes to glance through a Bristol Bulletin . . . then write for further facts about Bristol's instrument-engineering in *your* industry . . . you may be taking the first step towards solution of one or more of the fundamental problems facing your plant today. Such problems as these, for instance, have often been solved by a wider, more efficient use of Bristol's automatic controls:—*1. Lack of skilled men . . . 2. Shortage of raw materials . . . 3. Need to increase output without increasing space or equipment. . . . 4. Unnecessary spoilage and rejects . . . 5. Errors in putting new products into production.*

Bulletin 572—Typical of Bristol's Clear, Up-to-Date, Factual Information on Automatic Control of Mechanical Operations in Industrial Processes

Automatic timing of mechanical operations in industrial processes received its initial impetus when the Bristol Automatic Time-Cycle Controller was developed. Continuous improvements have been made through the years.

Here, in one concise 20-page bulletin, is a complete outline of this "template for efficient operation" — the mechanical operations you can control with it — the results in terms of quality, cost and increased production — details on its operation — and case studies illustrating its application to a wide variety of processes.

Bulletin 572 may point *your* way to a greater production efficiency than you have hitherto imagined possible. Write for it, together with any other bulletins described in the coupon.

THE BRISTOL COMPANY, Waterbury, Connecticut

The Bristol Co. of Canada, Ltd. Toronto, Ontario

Bristol's Instrument Co. Ltd. London, N.W. 10, England

BRISTOL *Engineers Process Control for Better Products and Profits*

AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS

Bristol's Time Cycle Control Speeds Canning and Drying Processes

Automatic changes of temperatures, opening of dampers and valves, *on a pre-determined time schedule,* is becoming increasingly important to wartime canning and dehydration processes, where maximum, uniform production is necessary. Whether on vacuum, compartment or tunnel driers . . . or a series of retorts operated on time schedules . . . Bristol's Cycle Controllers insure exact repetition of best procedures, from beginning to end of the canning or dehydrating process.

FREE **Bulletins from Bristol's Library of Engineering Data—One of Them May Help You Increase Wartime Production**

THE BRISTOL COMPANY
115 Bristol Road, Waterbury, Connecticut

☐ Please send me Bulletin 572, described above. In addition send me any of the Bulletins checked below.

☐ Bulletin 536—How to record and control pH value most efficiently with Bristol's potentiometers. Describes advantages of pH control and glass electrode method of measurement.

☐ Bulletin T-302—How to select and install Bristol's Fully-Compensated Liquid-Filled Recording Thermometers (minus 125° F. to plus 400° F.) with complete facts, nomenclature and typical chart record.

☐ Bulletin 550 — Instruments for Dairy Industries are described in detail, together with installation data for many types of dairy equipments and typical charts for pasteurization, heating, cooling and storage temperatures.

NAME.....

COMPANY.....

ADDRESS.....

.....

Bausch & Lomb Research Metalloscope with Photomicrographic Accessories

He's Making a Photomicrographic History of the War

The photomicrographer in his laboratory, whether in an industrial plant, in some distant United Nations base of operations or in a great research institution . . . whether his work is dedicated to war production or to the fight against disease . . . is today documenting each forward step that science takes.

Vital in war production and an essential heritage to those who will live in the days of peace to come, photomicrography preserves important findings that could otherwise so easily be lost. Photomicrography makes wartime experience in metallography, surgery, prophylaxis, chemistry . . . in all fields . . . available for peacetime applications.

Here is another field in which Bausch & Lomb instruments, developed in the interests of peacetime scientific and industrial research, go to war. Here is still further proof that this is a war of precision, where the optical instruments that insure accuracy in expanded production take an important place beside those other B&L Instruments used as fighting tools by our fighting men.

For Bausch & Lomb Instruments essential to Victory—priorities govern delivery schedules.

BAUSCH & LOMB

OPTICAL CO. • ROCHESTER, NEW YORK

ESTABLISHED 1853

AN AMERICAN SCIENTIFIC INSTITUTION PRODUCING OPTICAL GLASS AND INSTRUMENTS FOR MILITARY USE, EDUCATION, RESEARCH, INDUSTRY AND EYESIGHT CORRECTION

If the WAR ENDS

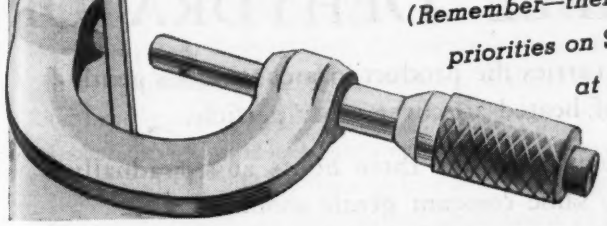
Wright's Automatic Machinery Company will be ready—ready for the needs of peace—ready to fill the needs of a new era requiring precision-built automatic machinery.

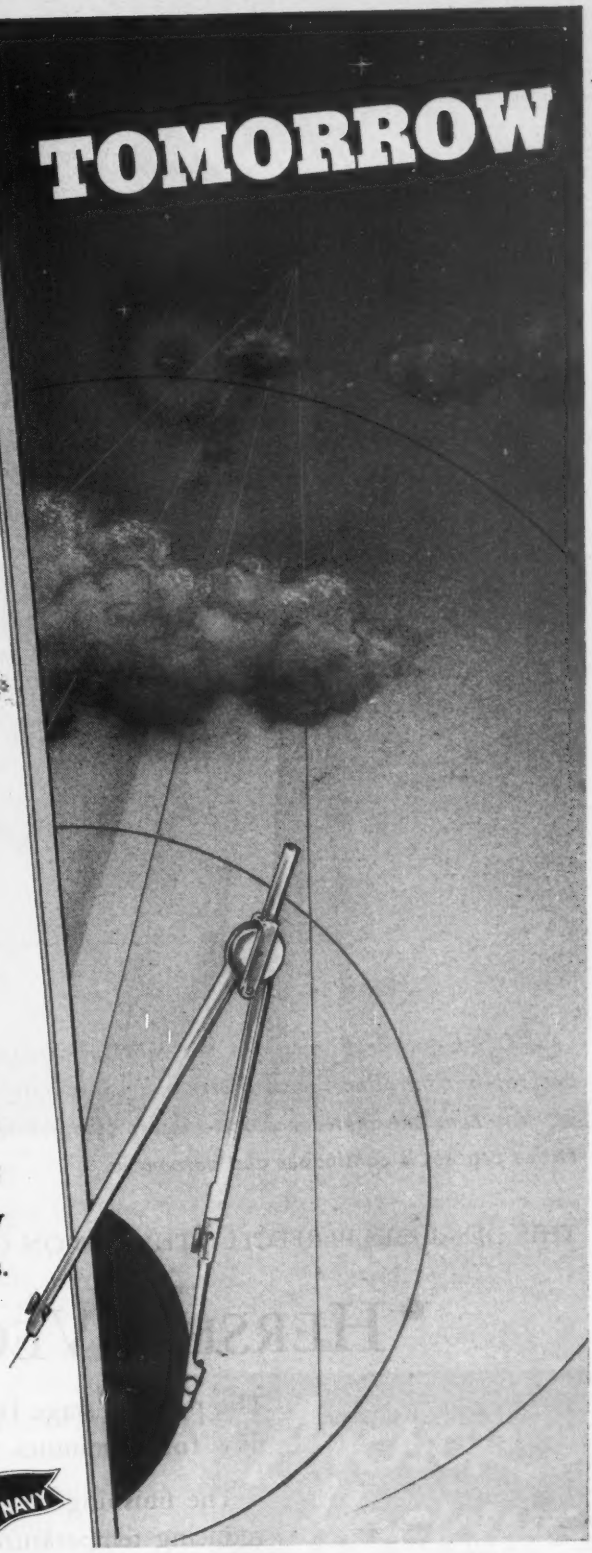
The war years are teaching us many things about new metals, new methods and principles. . . New ideas also are reaching maturity in technical engineering—some, years ahead of normal development.

Wright's are today absorbing and storing up ideas for the future. . . They are going farther and putting their experience and knowledge on paper. They are, in effect, planning for the future while they are busily producing for the present.

To users of Wright equipment and others, who are also planning for tomorrow, we offer our fullest cooperation in designing and development of automatic machinery they will need to solve post-war problems.

(Remember—there are no priorities on SERVICE *at Wright's)*





ARMY E NAVY

ESTABLISHED • 1893 •

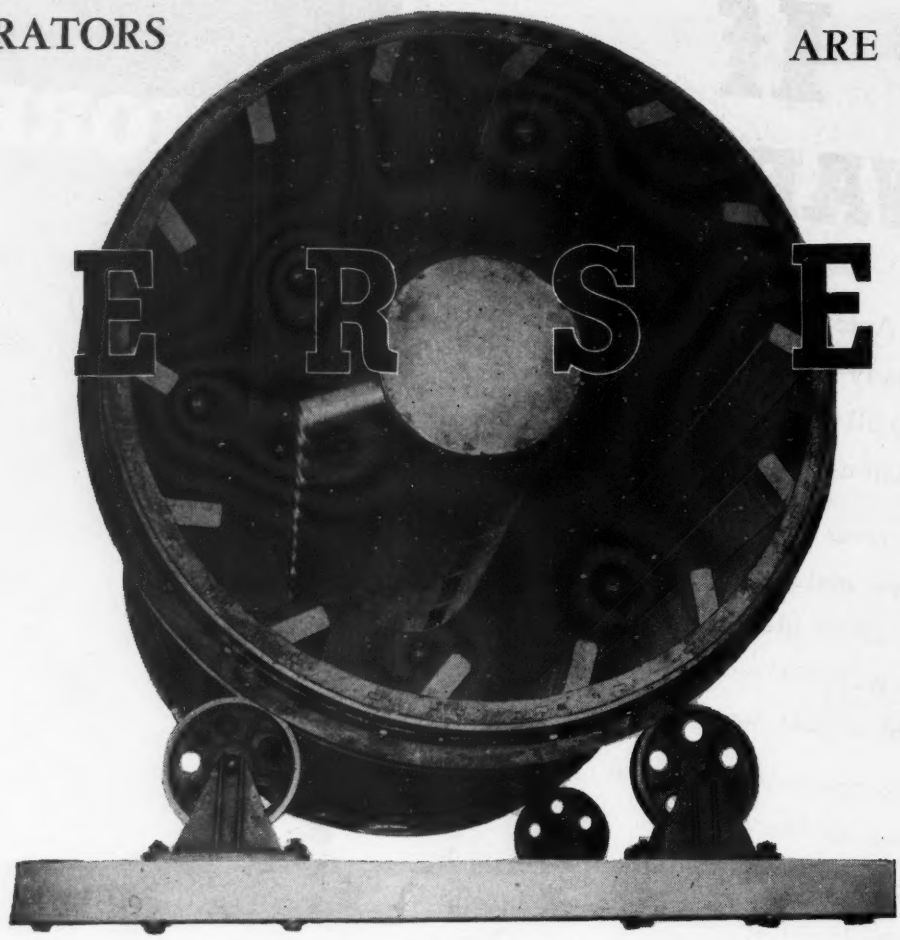
PACKAGING ENGINEERS

WRIGHT'S AUTOMATIC MACHINERY COMPANY

DURHAM CABLE ADDRESS YONWRIGHT NORTH CAROLINA, U. S. A.

NO OPERATORS ARE REQUIRED

H E R S E Y



"IDEAL dehydration of root vegetables is carried out in two stages, under accurately controlled temperatures and with relatively moist air. The product is in constant gentle motion to insure completely uniform drying, and the entire process is continuous and automatic.

THIS DESCRIBES PERFECTLY THE ACTION OF THE

• HERSEY VEGETABLE DEHYDRATOR

The primary stage Hersey Unit carries the product in a continuous gentle flow for 45 minutes while jets of heated air cover every particle.

The finishing stage holds the product for three hours at a gradually reducing temperature under the same constant gentle motion.

The Hersey Vegetable Dehydrator is completely automatic both in control of volume and temperature of air and in movement of product.

CATALOG PROMPTLY ON REQUEST

HERSEY MANUFACTURING CO.

DRYING ENGINEERS FOR MORE THAN 60 YEARS

381 E STREET • SOUTH BOSTON, MASS.

To help you solve packaging problems raised by your conversion to glass, Anchor Hocking offers you the services of these facilities free of charge:

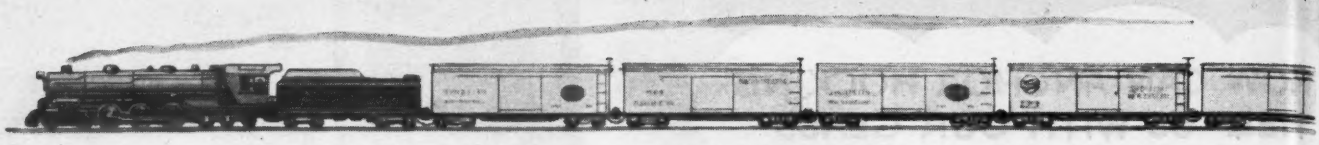
A Biological Laboratory equipped to determine food spoilage causes and to develop means and methods of prevention and sterilization. *A Chemical Laboratory* to test liners and coatings and recommend the most efficient and economical types for product protection. *A Packaging Research Division* to advise on the proper preparation, handling, packing, sealing, sterilizing and processing of food products. *A Package Design Department* to restyle packages for greater sales effectiveness, select container style most convenient and best adapted for the product, develop appropriate and attractive labels, including designs for decorated caps. *An Engineering Department* to help in developing better, more economical production methods and routines for the handling of glass packed products.

H. Q. MILLS, one of Anchor Hocking's ablest and most popular men, has been a member of the Anchor Hocking family for 36 years.

ANCHOR HOCKING

GLASS & CAPS

ANCHOR HOCKING GLASS CORPORATION LANCASTER, OHIO



PROTECT "WAR FOOD" IN TRANSIT

Box car fumigation with Dow Methyl Bromide—that's the real answer to complete protection for vital wartime food shipments. Here is the most effective, practical and convenient method of fumigating loaded railroad cars.

Methyl Bromide is applied easily and quickly through a closed system from outside the car—eliminating the need for gas masks. It is released under its own vapor pressure without the use of complex or expensive equipment. Either the convenient 1 lb. can or regular Methyl Bromide cylinder may be used.

Methyl Bromide possesses exceptional penetrating qualities—power to reach into the very center of every bag and package. It effects a complete kill of all insects in either the egg or active stages. Applications in properly sealed cars insure food against infestation—assuring the delivery of insect-free products.

A new leaflet on "Box Car Fumigation" is now available. Send for it today.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

New York · St. Louis · Chicago · Houston · San Francisco
Los Angeles · Seattle

METHYL BROMIDE

THE PENETRATING FUMIGANT

Dow

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

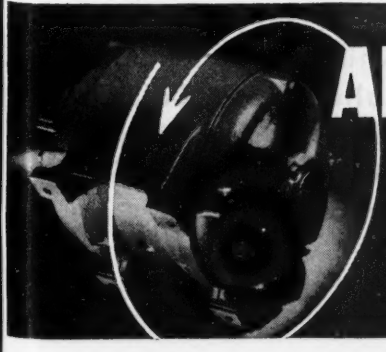
1 Pill for 9 Headaches!

PAGES FROM "A GUIDE TO WARTIME CARE OF ELECTRIC MOTORS"

ALL NINE electric motor enemies are present and accounted for in Allis-Chalmers' new "Guide to Wartime Care of Electric Motors." Streamlined instructions and story-telling pictures describe what they are, where they're found, how to fight them.

Designed for wartime U. S. industry, "Guide to Wartime Care of Electric Motors" has aroused such world-wide demand that Spanish and Portuguese editions are now printing!

You'll find this valuable new handbook ideal both for training new men and "brushing up" old hands. It contains no advertising. Write today for *your* free copy of this tremendously successful handbook to ALLIS-CHALMERS MFG. CO., MILWAUKEE, WISCONSIN. A 1625



ALLIS-CHALMERS MOTORS

When you do need new motors, look into the strength, solidity and all-around protection of the new "Safety Circle"—protected top, sides, ends and bottom.

AC WE WORK FOR VICTORY WE PLAN FOR PEACE

Protection of equipment has always been important in the Refrigeration Industry—even when replacements were instantly available.

Now that replacement materials are scarce and mechanical labor scarcer, equipment protection becomes vital to continuous operation. Thus, calcium chloride, long the favorite brine medium, takes on added importance because it minimizes corrosion, carries lower temperatures faster and aids in preventing leaks, corrosion and costly shutdowns for repair.

To keep your brine in tip-top condition, consult our Bulletin No. 30, a "Refrigeration Data Book" that contains extensive tables and data on refrigeration subjects with particular attention to brine preparation and maintenance to protect your equipment. Just write us to send you Bulletin 30, Calcium Chloride Association, 4145 Penobscot Building, Detroit, Michigan.

FOR DEPENDABLE REFRIGERATION
CALCIUM CHLORIDE

CUNO AUTO-KLEAN will protect these products from foreign solids

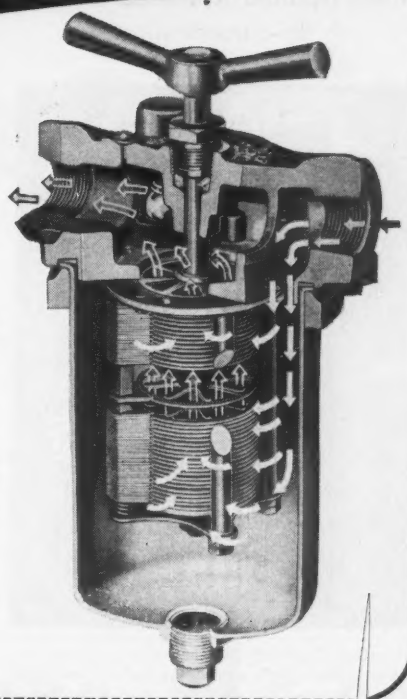
- Baby Foods
- Molasses
- Jellies and Preserves
- Candy
- Salad Dressings
- Cocoa Butter
- Oleomargarine
- Fruit Juices and Syrups
- Tomato Catsup
- Mustard
- Peanut Products
- Chocolate
- Lard Compounds and Substitutes

which means:

"Don't buy any more of that brand, Mom ...it's lumpy!"

What's the secret of *invariable smoothness?* We all know how hard it is to keep out *occasional* lumps and hardened particles; they get by — and often *we may never know it!*

How do *you* manage to keep your liquid or semi-liquid foods always *smooth?* Are you *insuring* against occasional lumps and impurities, the easy, efficient, low-cost way — with Cuno "Filter-Fine" Strainers?



Cuno Auto-Kleans are Non-Collapsible, Completely Controllable, and Continuously Cleanable without Interrupting Flow

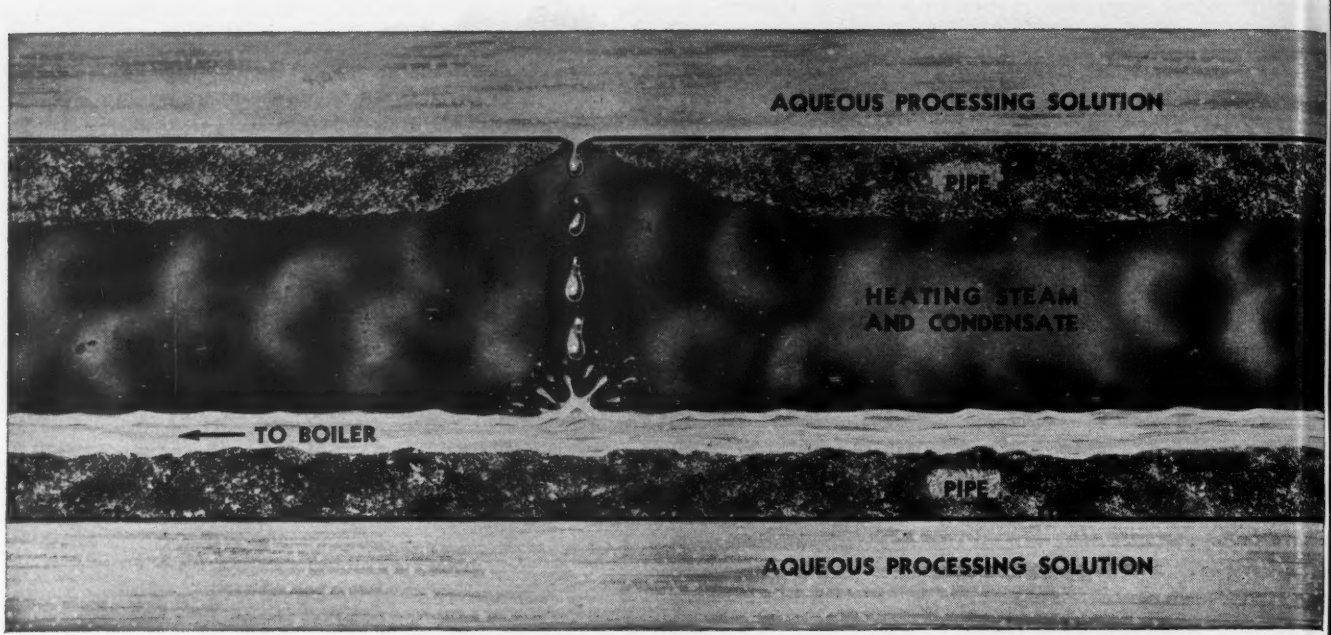
Take a look at the diagram for a quick view of a new, *never-failing* straining method. The metal filter discs *cannot* collapse, whereas wire screen strainers are apt to break and puncture. You can get the *exact degree of fineness* you want — all solids larger than specified will be broken up or removed. And Cuno Auto-Kleans are *non-stop strainers:* turn the handle — by hand or motor — and you "comb out" accumulated solids without interrupting flow. Write for "Quick Facts". Get the whole story!

KEEP FLOW ON "GO" WITH

CUNO

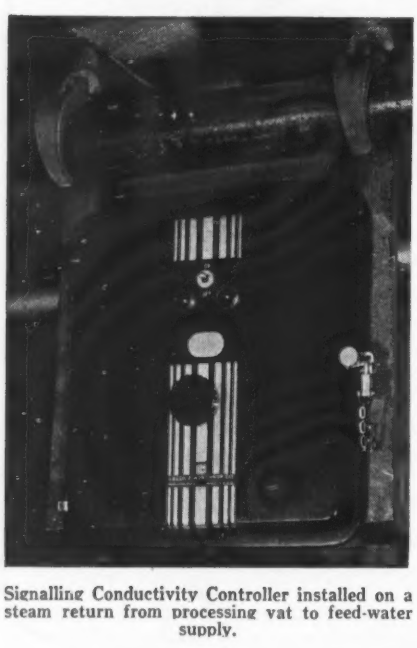
THE "FILTER-FINE" STRAINER

CUNO ENGINEERING CORPORATION
407 South Vine Street, Meriden, Conn.
Send me the free booklet, "Quick Facts".
NAME.....
COMPANY.....
ADDRESS.....
Product to be strained.....



WANT TO IMMOBILIZE THIS LEAK?

To keep contaminated condensate from sneaking into a boiler's tubes and sabotaging steam production, we can supply an instrument which will halt the potential damage at its source, and hold it immobilized while a maintenance pipefitter repairs the leak and thus ends the contamination.

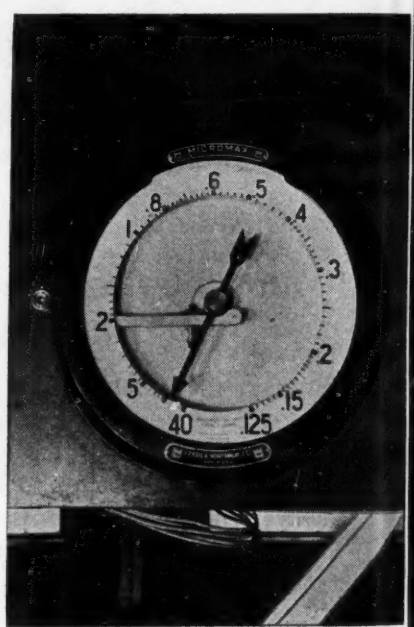


Signalling Conductivity Controller installed on a steam return from processing vat to feed-water supply.

The method employed is to measure, continuously, the electrolytic conductivity of the water, and open a dump valve in the line when a leak is indicated by a rise in conductivity. The instrument employed may be either of the following:

If the operation of a signal light and the opening of the dump valve are all you require when a pipe springs a leak, we recommend No. 4850 Signalling Conductivity Controller. This instrument has no moving parts except a relay; requires practically no maintenance; gives protection at minimum cost.

If you want a continuous, automatic record of the purity of the condensate, in addition to an automatic signal and the operation of a dump valve, we recommend No. 33111 Micromax Signalling Recorder. This instrument can be read from a considerable distance, and its chart records are 10⅝" diameter. It requires no more attention than does a temperature recorder.



Micromax Controlling Recorder used by the Crossett (Ark.) Lumber Co., on a water line.

For further information, see Catalog N-95-163(1), on the Signalling Controller, or Catalog N-95-163, on the Micromax Controlling Recorder.

depends on me!
A Slogan For All Americans
Jrl Ad N-95-163(3)

LEEDS & NORTHRUP COMPANY, 4912 STENTON AVE., PHILA., PA.
LEEDS & NORTHRUP
MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

A BEMIS MULTIWALL PAPER BAG EXPERT may help you

SAVE TIME and man power on bagging and loading operations.
CUT LOSSES due to bag breakage in filling and shipping.
IMPROVE CLOSURES to prevent sifting.
ADD SALES APPEAL to your product through better packaging.

He's at your service without cost or obligation

You can benefit from the counsel of a Bemis Multiwall Paper Bag Expert whether you are a Bemis customer or not. So please feel free to call upon us any time you have a troublesome bagging problem. You'll find the Bemis Man an expert on all phases of such problems, from bag design to closing machinery, shipping and storing. Let him study your bagging operations to see if he can increase output, lower man power, cut costs or reduce waste for you. His call will cost you nothing and place you under no obligation.

SAVE 8 MEN IN PACKING AND LOADING OPERATION

A plant shipping products in multiwall bags required 16 men to pack and load their output. A Bemis Multiwall expert recommended rearrangement of packing equipment and slight mechanical changes. Results: 8 men doing the work previously requiring 16!

BEMIS BRO. BAG CO.

Better Bags for 85 Years

Peoria, Ill. • East Pepperell, Mass. • Mobile, Ala.
San Francisco, Calif. • Wilmington, Calif. • St. Helens, Oregon

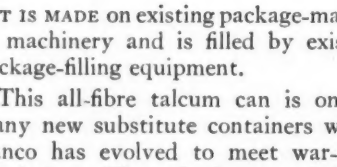
Baltimore • Boston • Brooklyn
Buffalo • Charlotte • Chicago
Denver • Detroit • Houston
Indianapolis • Kansas City
Los Angeles • Louisville
Memphis • Minneapolis
New Orleans • New York City
Norfolk • Oklahoma City
Omaha • St. Louis • Salina • Salt Lake City • Seattle • Wichita

Canco's New Powder Container—for the Home Front

. . . here is our newest "wartime" package for talcum—dusting—dental and other powders.

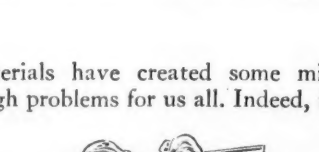
IT IS MADE on existing package-making machinery and is filled by existing package-filling equipment.

This all-fibre talcum can is one of many new substitute containers which Canco has evolved to meet war-time restrictions. Through the use of these, war-time packaging and distribution



problems for many products can be solved.

As you well know, restrictions on materials have created some mighty tough problems for us all. Indeed, there



are certain demands which cannot be met immediately with the limited materials available. But, where problems call for technical skill and adaptations, Canco is coming forward with ingenious and highly practical suggestions and substitutions.

Yes indeed, Canco technicians and research men are constantly working for you. We at Canco accept it as our obligation to do our utmost to come through with suitable solutions to present packaging difficulties.

This work, of course, must and will proceed without interfering in any way with the large and important contributions we are making daily to the war effort.

AMERICAN CAN COMPANY

230 Park Avenue, New York, N.Y.

Engineering Design
—Creator of America's Mechanized Might

In war, as well as in peace, the design engineer is the vital link between the inventive mind and the mass-production reality

It is gratifying and interesting to note that reports of new "secret weapons" not only have reversed their course during the past few months . . . they also have increased in frequency. Once they filled us with dread and misgiving. Today the enemy does the worrying.

Word about the latest new Army weapon reached us as this was being written . . . a 2½ ton truck that performs on water as well as on land with equal efficiency. "The Duck", resembling an overgrown amphibious jeep, is particularly suited to landing operations where docks are lacking. Loaded with 20 fully equipped soldiers or their equivalent in supplies, its propeller runs it ashore. It climbs the beach on its six-wheel drive and continues the trip on land.

This important addition to our "second-front" fighting equipment, coming so closely on the heels of the now famous tank-killing "Bazooka", is one of many history making contributions of American design engineers — the men who transform nebulous ideas into practical realities — the men who make our war machines superior to those of our enemies.

Invasion and eventual victory became a certainty as soon as America's design engineers threw their full effort into the war against aggression. Adapting intricate ordnance designs to mass production, these men developed weapons such as the M-10 destroyer of Rommel's tanks and brought out the new fighting planes and bombers that have won the air superiority that has turned the tide against the Axis. Taking ideas and giving them form, selecting the materials of construction, deciding upon the method of fabrication, adapting the electrical and mechanical parts that power the product, specifying the finish that protects and beautifies it . . . these men are the focal point of American production. Their ingenuity has no parallel. Once they put automobiles on a mass production basis and within the reach of all. Today, after less than three years and with little previous experience in armament design, they have brought America's war weapons to the highest efficiency . . . surpassing Hitler's weapons despite all the vaunted scientific wizardry of the Germans and their ten year start.

At this point it is well to remember that while Germany's military might is traceable to its superiority in armament, many of the basic technological discoveries (including the airplane and the submarine) are the products of American genius. The Germans always have been aware of the military advantages of technological superiority and have forced its expansion with all their might. They knew that mobility and surprise play a decisive role in modern warfare and their design engineers were kept busy, with unique intensity, to achieve unprecedented results in fast-moving, hard-hitting fighting equipment. Our own military and industrial engineers did not go into action until it became certain that we would be involved in the conflict. But even before our country actually embarked on its Preparedness Program they were busily engaged in developing the designs of our war equipment. Tanks, planes, guns, ships and hundreds of other apparatus and machines of war were studied. Carefully selected committees of our national engineering societies were organized under the leadership of the Army Ordnance Department to serve as advisors and consultants in the development of advanced designs of tanks and other motorized equipment of war. The above mentioned "Duck" and the now famous Sherman tank are just two of the many results of these efforts.

After the Preparedness Program had officially been launched and Congress had made its initial appropriation, it was necessary to create the manufacturing blueprints from which the engines of war could be built. Because the designs of the machines of production, as well as the designs of the products themselves, determine the speed and economy with which anything can be manufactured,

This is the thirteenth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

the capacity of our industrial system is dependent, to a considerable extent, upon the ability and ingenuity of American design engineers. Germany's military might was successfully mechanized because Germany, for more than 10 years preceding the war, was riding the wave of a world-wide technological revolution. This revolution was as far-reaching as the advent of the electric motor and the internal combustion engine. It was born of the profusion of inventions and discoveries since the last war. German design engineers took advantage of every one of these.

If we are to defeat our enemies and if we are to continue to play the leading role in the post-war world we must make better use of the new technology than do our enemies. The job is up to American product engineers who already have made tremendous strides in designing the intricate machinery of production and of war equipment. Much remains to be done however.

It has been said that the Germans have not developed one single item that can be classified as basically original, nor are there indications that any so-called "secret weapon" will henceforth be developed by them. Today the Nazis are completely outclassed by the tremendous manpower of engineering brains that is at the disposal of American industry. Although we were faced by the same fundamental problems of shortages in materials, manpower and time, our engineers not only solved these problems quickly and effectively, but they outstripped the enemy by the preponderant weight of talent which we were able to bring to bear upon our problems. As is evidenced by studies of the designs of captured German war equipment, our airplanes are faster, carry heavier loads, have superior protective armor and heavier armament. Our tanks, especially the Shermans, stand unmatched. Our tractor-mounted artillery excels theirs in fighting power. Our automotive vehicles are the envy of the world. Our battleships are supreme. Our signal and detection devices are frustrating all of our enemies' attempts to dominate the seas.

And as we approach the end of the conflict, the pattern of which already has been set, the forces that converted American industry from peace to war-production will again be brought into play, and the product engineer will continue to be the fulcrum. Our post-war industry will grow from his blueprint. Nor will his job be any less urgent, any less responsible, any less sweeping in its effects than were his efforts during the war-preparedness program.

Since the cessation of the manufacture of peace-time goods, many new materials and production techniques have been developed. Plastics, synthetic rubber and magnesium in the field of materials were relatively new and restricted in their uses when war came. So were powder metallurgy, induction heating, electrostatic heating, adhesives for joining metals and compressed resin-impregnated wood. The new possibilities in product design created by the electronic devices and applications developed during the war period virtually stun the imagination and the "atomic revolution" promises to change the entire pattern of manufacturing operations.

Never before has there been so much speculation about the future as there is today. Looking forward, who can doubt our limitless capacity to continue our industrial world leadership?

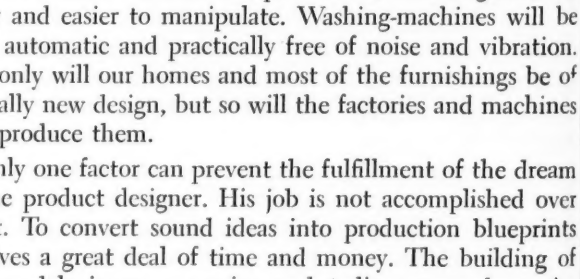
While no one can predict developments in product design in the post-war period, certain it is that they will be so vastly different and so far superior to existing designs that they will obsolete most products as we know them today. With engines of vastly superior metals, designed to burn 100 octane gasoline and built to a precision ten times greater than that of pre-war engines, our post-war automobiles will give from 40 to 60 miles to the gallon. Tires will last from forty to fifty thousand miles. The comfort and smoothness with which these cars of tomorrow will glide along are undreamed of today. Polaroid windshields will eliminate the glare of oncoming headlights and the driver will need to give but scant attention to the manipulation of his simplified gear shifts.

According to no less an authority than Igor Sikorsky, we stand on the threshold of a new air age in which the helicopter will contribute to the greatest prosperity we have ever known.

Prophecies are hard to make at a time like this but speedy house building seems to be a certainty in the world of tomorrow. Air conditioning, new methods of heating, humidifying and drying, promise to be necessities in the post-war home. Vacuum sweepers will be much lighter, less noisy and easier to manipulate. Washing-machines will be fully automatic and practically free of noise and vibration. Not only will our homes and most of the furnishings be of radically new design, but so will the factories and machines that produce them.

Only one factor can prevent the fulfillment of the dream of the product designer. His job is not accomplished over night. To convert sound ideas into production blueprints involves a great deal of time and money. The building of test models is an expensive and tedious procedure. An abundance of seed money is required to perfect the product, to develop mass-production methods and to bring it to fruition as a finished saleable product.

It is the patriotic duty of every industrial leader to hasten these developments so that the material benefits created by them may speed our progress along the road of abundance.



President, McGraw-Hill Publishing Company, Inc.

FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor JULY, 1943

Food Processors Have A Public Relations Task

"PRODUCTION and distribution" are the only terms by which the WFA describes the businesses of raising crops and getting the food to the public. In Washington parlance, the word "production" means farm production, while the word "distribution" covers industrial food processing plus what all of us know to be distribution.

Why, in Heaven's name, is not the *processing function* officially recognized? Why does official Washington give no cognizance to the largest peacetime industry in the country? And why don't the processors themselves do something about it?

Industry Should Assert Itself

This is no mere quibbling with words and terminology. Unless the food processing industry asserts itself, the idea will develop in Washington that processing is purely incidental to distribution. To illustrate how insidious is this poison, let it be recalled that recently a large association of food processors adopted a set of resolutions in which production and distribution were referred to eight times. The words were used in their accepted industrial sense, but the resolutions were to be sent to WFA where production means farming, and distribution means processing and distribution.

It is far too late to force a change on Washington for, beginning with the President's Executive Order creating the War Food Administration, all subsequent orders and directives have contained this erroneous generalization. And the whole WFA is set up on this erroneous concept.

Unless the food processing industry insists on official recognition of its function as quickly as possible, the day will surely come when some ill-considered directive will come out that will ignore the existence of the processing function altogether to the end that the industry will be in serious difficulties.

The food processing industry has a job to do, just as much of a job as protecting a trademark, a brand name, a patent or a property right.

Washington Must Be Educated

Washington must be made to know and to realize that the business of feeding America is the work of a team—a three-function team—farming, processing and distribution. Under a wartime economy, it is the duty of Washington to coordinate the work of the team, as a three-unit team—not as a two-unit affair.

If the war were to end in six months, perhaps no harm would come from this continued blindness toward the job which the processor performs. But the war may run on for years. And after that—the International Food Conference has a plan of taking over. You have to hunt a very long time through the voluminous reports of the conference to find even the slightest mention of processing. This is not wholly unexpected, for the agenda of the conference stemmed from the same style of Washington thinking that omitted processing from Executive Order No. 9280.

Processing Treated Too Casually

If the food processing industry is to avoid being relegated to a secondary place in the regulation of the food situation, then it must insist on recognition of its function now and all the time. There is no other industry that is treated so casually and so easily forgotten by the men who are running things in Washington.

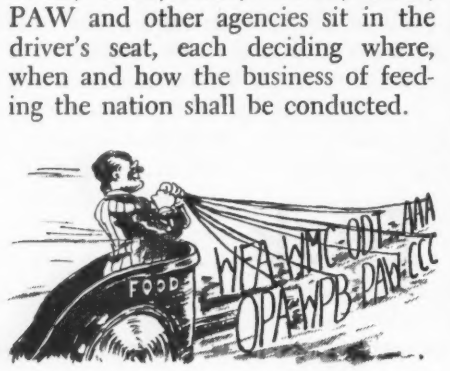
The industry has an urgent public relations job to do to establish its correct function in the minds of those authorized to control its operation.

L. V. Burton EDITOR

The Talk of the Industry

• EVER see an eight-horse team driven by one man? A pair of reins from each horse is held securely in his husky grip. All eight horses go where the driver decides, or else the long blacksnake whip.

Compare the foregoing to our national food set up where WFA, OPA, WPB, CCC, AAA, WMC, ODT, PAW and other agencies sit in the driver's seat, each deciding where, when and how the business of feeding the nation shall be conducted.



What we need is a single driver who knows where he is going and coordinates all activities to that end. Call him a czar if you want, but he must be given complete power.

• WITH union "war chests" often running well into seven figures, there is no reason why the more powerful labor unions should not buy their way into the management of industrial corporations by the simple method of acquiring the necessary amount of capital stock. Wrong John L. Lewis once felt sufficiently affluent to donate about a half million of United Mine Workers' money to a political party. The Brotherhood of Locomotive Engineers once owned the Equitable Building at 120 Broadway, New York, one of the big office buildings of the United States, later selling it and losing much of the money in the Florida boom back in the 'Twenties.

But, be it noted, Wrong John did not buy a coal mining company, nor did the Locomotive Engineers buy a railroad. Your guess as to why not is as good as the next one.

• FLORIDA oranges *vs.* "navel-type" oranges from somewhere else are the subject of recent advertising of dubious merit by Florida Citrus Commission of Lakeland, Florida. Invidious comparisons of this sort are dangerous. They may even boomerang, as they once did on claims regarding vitamin C content.

• THE untimely death of Edsel B. Ford from a combination of undulant fever and other ailments should give pause to those who oppose pasteurization of milk. In cows the disease is known variously as Bang's disease or contagious abortion, and in humans as undulant fever or Malta fever. It is characterized by alternating periods of fever and normal temperature, but it has so many other symptoms that physicians often mistake it for some 25 other diseases.

The only sure way to avoid undulant fever is to pasteurize all milk, even from the pet family cow.

• A PERIOD of corporation mergers is developing in the food industry that is reminiscent of the mergers in the late 'Twenties. Behind-the-scenes activities are noteworthy. One manufacturer has been sounded out no less than seven times to ascertain his willingness to join with as many different enterprises.

Outward results have been observed in the case of Standard Brands, General Foods, American Home Products, several distilling companies who fear the future of supply of cereal grains and have purchased wineries, and Ballantine Brewing Co., all of which have acquired new subsidiaries within recent months.

• CHILDREN under 18 years of age employed in food processing plants usually come under the Fair Labor Standards Act.

If in doubt you should obtain information from the Children's Bureau, U. S. Department of Labor, Washington, D. C. But don't overlook the possibility that State labor

standards may impose higher standards than the Federal law.

• THE STRING of excellent eating places accessible only by auto, called the Howard Johnson "stands," has been hard hit by gas and tire rationing, but Howard Johnson himself seems to be equal to the emergency. He now is undertaking to operate industrial mass feeding establishments for war workers.

• "THE breaks must be with the farmer from now on if he is to attain the goal that the War Food Administration has set."—S. B. Bledsoe, Administrative Assistant to the Secretary of Agriculture (*The New York Times*, June 13, 1943.)

"If production goals (for 1943) are not attained we soon shall be scraping the bottom of many a barrel."—Dr. Russel M. Wilder, of Civilian Food Requirements, WFA (*ibid.*)

"The problem of food distribution is primarily the responsibility of the Office of Price Administration."—S. B. Bledsoe (*ibid.*)

Write your own comment.

• SCARCITY of corn for industrial processing is causing no end of uneasiness. Many corn grinders face reduced operations. Some have actually shut down. This will affect all users of starch, corn sugar, corn sirup, corn grits and those animal-feed industries which depend on the protein concentrates from the corn grinders. Not only may these difficulties become acute, but the corn shortage is forcing users of corn for fermentation purposes to substitute other carbohydrate sources such as wheat.

Cause of the apparent scarcity of corn lies in OPA and other governmental price controls which make it more profitable to feed animals to heavy weights than to sell the grain on the open market. Unless price controls are adjusted to favor marketing of grain, the situation will persist in its present unhealthy state.

Food Conference Proposes To Rid World of Hunger

To evaluate the results of the Hot Springs International Food Conference at this time is premature. This was a study group, not an action group. If we go back to the National

Nutrition Conference for Defense in May, 1941, for its prototype, we can find in the instructions to the section chairmen, secretaries and delegates something which probably paralleled the basic philosophy of the Hot Springs conference. At the nutrition conference the avowed purpose was an attempt to discover what ought to be done, not how to do it. Because Hot Springs was not a plenary conference with power to commit anybody to definite acts, all it could do was set forth a statement of desirable goals presumably acceptable to all the conferees.

It will take some months for the 44 nations represented at the conference to digest the findings and realize the political and economic implications of the proposed program. Boiled down to a few words, the conference has proposed a sort of international new deal as a means of achieving "Freedom from Want" for about 1,600,000,000 people who were represented there. This is about two-thirds of all the people on earth.

To banish hunger and want from all these nations by raising standards of living and standards of nutrition to the highest level known in the United States will obviously require profound economic, agricultural and political changes unless perchance the United States can by some miracle continue Lend-Lease into a remote postwar period. The foreseeable enormous changes in price structures, tariff structures and world distribution of foodstuffs, together with corollary problems of subsequent changes in costs of production and processing that must inevitably follow the lowering of tariff barriers to achieve world-wide freedom from want via the Hot Springs route, will require months of Congressional hearings and debates after the war is over.

If the proposals coming out of Hot Springs are ever put into effect the world will be so different you won't be able to recognize it. To be sure, the proposed changes will cost us a heap of money, but if war is forever after avoided it might be well worth it.

The cost of this war to the United States will be at least $300,000,000,000 up to the time the shooting stops. How much more it will cost after that is anybody's guess. Heretofore, nations have apparently proceeded from the unspoken theory that bullets are cheaper than food. But the cost of killing a man is rising rapidly. Possibly we shall realize at the end of this war that food can be cheaper than bullets. If mankind will ever come to this realization, the recommendations of Hot Springs are likely to be adopted and put into effect for a lengthy trial.

You will probably see many books and articles on the subject before the nations begin to adopt the proposals in earnest. It's an international postwar food plan, and should be regarded as that and studied accordingly.

Office of War Mobilization

Successor to S. 2721, 77th Congress, "to establish an Office of Technological Mobilization" is S. 607, 78th Congress, "A bill to establish an office of War Mobilization." (See FOOD INDUSTRIES, January, 1943, page 41, for a discussion of the former.)

S. 607, commonly called the Kilgore Bill after Senator Kilgore, takes in everything in its predecessor bill, and then some. S. 607 will create an independent agency, OWM, with a director at $20,000, four administrators at $15,000 and four deputies at $12,000. It will include the following offices, headed by the administrators and their deputies: Office of Production and Supply, Office of Man Power Supply, Office of Scientific and Technological Mobilization, Office of Economic Stabilization.

Within the OWM there is to be established a Committee on Requirements and Program, consisting of the Secretaries of War and Navy, Chief of Staff of Army, Chief of Naval Operations and the four administrators.

In short, the bill will reshuffle all the government agencies that have to do with the war, and will furnish a central coordinating body with authority but without much power

Hors d'Oeuvres

• Shark steaks are being added to the nation's menus. Another case of man bites dog.

• *This story is told by a Congressman: A rancher asked permission to buy canvas to build lambing pens, and WPB suggested that he postpone his lambing season until more favorable weather.—There are some deliveries that even WPB can't postpone.*

• A migrant farmer and father of five who follows the crops from Florida to New Jersey says, "You make more money than staying at home, the climate changes are stimulating and besides it helps the government. The roots of Americanism grow deep.

• *More than 6,600,000,000 doughnuts were consumed in this country last year. If stood hole to hole they would reach about three times around the world, and if stood end to end, it would be a lie.*

• National collections of waste household fats have been increasing by gratifying leaps. Hitler and Hirohito put the fat on the fire, but American housewives are taking it off.

• *In the 15th century an Abyssinian shepherd noticed that some of his goats had more pep than others. Then he discovered that the souped-up goats got that way by eating coffee berries. The shepherd ate some of the berries, and he, too, acted as if he had just had his valves ground. Which led to coffee being used as a food and later, in Arabia, as a beverage. It's popularity grew steadily from the time the goats got the coffee until coffee rationing got our goats.*

• Quote from a puff for peanuts: "The peanut has human interest, it has romance and it has an element of humor. The lowly peanut is beloved because of its peasant status. It is not an aristocrat among nuts."—And neither is the guy who wrote that.

• *It has been suggested that women in industry be called the Women's Industrial Corps—WIC's for short. As compared with the WAAC's the WIC's keep the home fires burning.*

• American soldiers, it is reported, amaze the Australians with their capacity for drinking—drinking milk.

• *Says a linen supply association, less food on the tables of public eating places has resulted in fewer stains on the tablecloths. In Europe if they had stains on the tablecloths they'd list them on the menu.*

• After a three-day trial of a highly nutritious experimental Army ration, one of the soldiers said he thought "men would survive longer on the ration than they would care to live on it." Double damning with faint praise.

• *There has just been published a booklet containing 600 timely phrases to aid in writing productive help-wanted advertising. Ten years ago the employment agent's vocabulary consisted of three little words.*

F.K.L.

other than that already delegated to the government agencies to be taken into camp. The OWM will get $200,000,000 to prosecute research and development under the Office of Scientific and Technical Mobilization.

Six months after the war is over the OWM is to terminate.

Up to now the bill has been tabled by the Senate. But it might be resurrected, and should it be enacted will place all research in the nation under its wartime control. It should never be enacted.

Falling Asleep at Work

Weary workers have been reported falling asleep on night shift jobs in some seasonal food plants. This has occurred despite free coffee served twice a night (last year).

It is scarcely necessary to dwell upon the problem that such defections throw upon already overburdened management. But how to cope with such a problem in days of labor scarcity deserves much study.

Admittedly one cannot always be very "choosy" in hiring employees for night work. There are times when it is a great achievement to assemble an extra crew in a seasonally operated business, regardless of their abilities or energies.

Here are a few observations from one who has been a night worker (and hated it). In these notes may lie a clue to better results from night shifts.

1. Some people, like the chickens, get sleepy when darkness comes, and there is nothing but bright light that can change their physiological habits.

2. Some persons cannot sleep well in daytime, and hence are dead on their feet at night. This appears to be due to several causes which are listed in their order of apparent importance: (a) Thin eyelids. Such persons will awaken whenever a light is brought into their sleeping room. The remedy is, of course, a really darkened room or black blinders for day sleepers and plenty of bright light where they work at night. (b) Failure to go to bed in time to get eight hours of sleep. It is hard to turn in at, say, 8 a.m. and arise at 4 p.m. when there are many activities going on around the home. (c) Noise, especially children screaming, lawn mowing under the window, carpentering nearby. Remedy: ear plugs, such as "Flents." (d) Drinking coffee before retiring. A returning night worker often eats at the breakfast table of the rest of the family.

When night work can be arranged so that the worker can sleep at least four hours in natural darkness it helps a lot. But there is no substitute for sleep, nor is there any way to make folks go to bed on time. Persuasion is the only way.

Paper Scarce Again

The paper shortage is becoming worse. It is even alarming to food manufacturers, many of whom are not yet aware of the tightness of the situation. Every possible packaging substitute for critical metals and glass adds greatly to the paper package volume, but this is not the real source of the trouble. Shortage of wood cutters in Canadian woods lies at the root of the difficulty. And OPA attitude on prices does not make it possible to pay lumberjacks enough money to keep them from going to war industries.

What to do? Save every possible scrap of paper. Avoid using paper wherever possible. Whatever uses of paper must be made should be as frugal as possible. Most serious is the shortage of kraft paper, for it goes into military packages, is shipped overseas, and never comes back as scrap. A possible solution to the problem would be to send Axis prisoners of war to the north woods and employ them as wood cutters. Unless something like that is done to augment the labor supply, the food industry will be forced back to the cracker barrel era, only there will not be many barrels.

Paper economy should be your watchword.

Subsidies for Processors

Subsidizing food processors from government funds as a step in rolling back retail food costs now faces the industry. It is forced by a labor administration's unwillingness to deal with rising labor costs with the same firmness that it uses elsewhere.

Heretofore the subsidy has been used to make increased production possible. The ship subsidy, air mail subsidy and the subsidy to high-cost copper mines are examples of this use. But the subsidy to hold down selling prices is relatively new, and because it goes contrary to all business experience it is meeting much opposition. Subsidy here is in an entirely new field of activity.

There are plenty of food processing plants to take care of the food raw materials now available, though many of them need new or additional processing facilities. What the government proposes to do is to buy the raw material from farmers at high cost and sell it to processors at a lower cost so that processors' selling prices are held stable.

Though some economists aver it is economically sound, the idea is politically undesirable. And the managements of food companies dislike it because true costs and selling prices are no longer in a businesslike relationship. Dependence for a normal profit on the government bounty does not make for peace of mind nor self-reliance. The subsidy is a demoralizing force, the full effect of which will become most apparent when the subsidy is removed.

Reverse Our Policy?

Up to now, FOOD INDUSTRIES has been crusading for an improvement in the handling of our vital food supply. Long before Pearl Harbor, even before the conquest of France, we had been able to foresee the error of our national food policies and have been endeavoring to bring about their correction.

That we have been right, more right than we had hoped, is no source of satisfaction. For here was a case when it would have been far more comforting to be wrong. Not only have national policies been wrong on food supply and food processing, but we are now confronted with adverse growing weather.

At this point a friend has counselled that we stop our endeavor to wake the nation to the error of its ways and, instead, applaud the miscalculations that must inevitably lead to a marked reduction in our food rations. His viewpoint is that the Administration's internal policies are, like the chickens that come home to roost and defile the back porch, the only force that will motivate the body politic to rise in hunger and wrath and throw out the theorists, lawyers, dreamers and incompetents.

His theory is that to rid ourselves of the New Deal gang we must insure national hunger in 1944, so that the lighthearted electorate will repudiate its own handiwork.

Are you for it or ag'in, it?

Wartime Problems and Progress Discussed by IFT

By G. L. MONTGOMERY, Associate Editor, "Food Industries."

Food supply, effect on war economy, improved technics of preservation and packaging and recent results of researches in food processing were discussed at the conference held in St. Louis

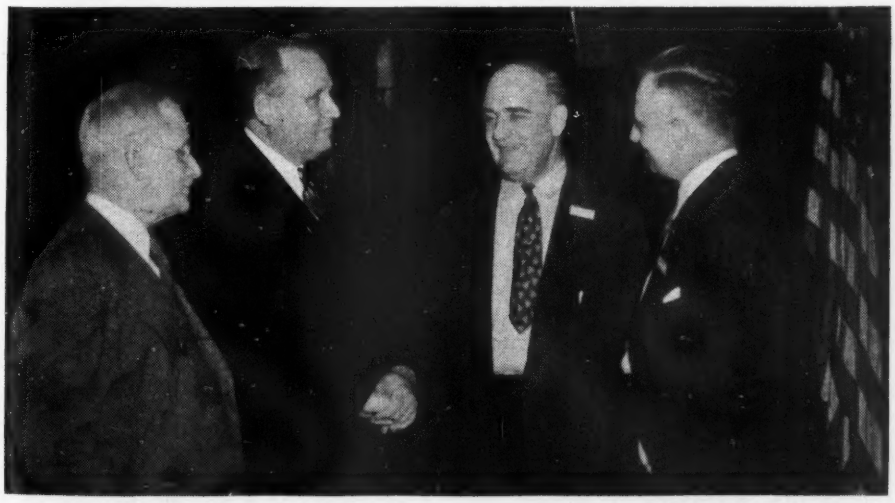
Wm. V. Cruess, the 1944 president of IFT, in an informal pose at the conference. With the University of California, he was the 1942 Nicholas Appert Medalist.

FACED with the prospect of decreasing food supplies at a time when demand is rapidly rising, 400 members of the Institute of Food Technologist met in the fourth annual food conference of the Institute in St. Louis, Mo., June 2-4, 1943. "Food in War" was the general topic of the meeting, and the keynote was struck by Dr. Noble Clark, associate director, Agricultural Experiment Station, University of Wisconsin. Dr. Clark stressed the fact that the available food supply depends entirely upon the output of food raw materials and that certain changes in national agricultural policy are needed if the United States is to feed its own population and armed forces and, in addition, meet its food commitments to our allies and others. Among the recommended changes in policy that the speaker considered as necessary if food supplies are to be increased were:

1. Doubling or tripling of the production and use of chemical fertilizers.
2. Making synthetic nitrogen available in the form of urea for purposes of cattle and sheep feeding, in order to overcome the existing shortage of protein feedstuffs.
3. Removing of all restriction on the manufacture and sale of repair parts for farm machinery.
4. Manufacturing more new farm machinery than now contemplated for use in 1944.
5. Placing of floors under the prices of the most essential farm products, so that farmers will have the confidence necessary to permit them to increase production.
6. Improving of farm manpower situation; in particular by placing deferment on a priority basis so that those would be deferred who contribute to the production of substantial amounts of essential foods.
7. Strengthening of national program for increased food production by making more use of state agencies and state farm leaders who have better understanding of local problems.
8. Placing of full responsibility for increasing food production, processing and distribution on one Federal agency, eliminating the present competition and conflict between agencies.

Finally, the speaker pointed out that the true solution of our food supply problem lies in increasing food production, rather than in trying to divide up a scarcity.

Speaking on the same general topic, R. C. Sherwood, assistant chief of the civilian food requirements branch, U. S. Department of Agriculture, stressed the need for improving the nutritive value of basic foods, but cautioned that, in doing so, it was necessary to remember that it is hard to get the consumer to shift to unfamiliar food products, particularly in wartime. Therefore, any steps toward enrichment or fortification should be made only in such ways as are readily acceptable by consumers.



Three outstanding members of IFT chat with a guest speaker. Left to right, S. C. Prescott, past-president of IFT and 1943 Nicholas Appert Medalist; Wheeler McMillen, president, National Farm Chemurgic Council, banquet guest speaker; F. C. Blanck, H. J. Heinz Co., elected vice-president of IFT for 1944; and R. C. Newton, Swift & Co., the 1943 president of IFT.

Role of Food in War

One session of the conference was devoted to food problems growing out of the war. Leading this discussion, Col. R. A. Isker, of the Quartermaster Corps subsistence laboratory, pointed out what the armed forces particularly need in foods. Among their most pressing problems are keeping quality, storage, packaging that will give adequate protection, and the stabilization of fats that must undergo severe transport and storage conditions. Food supplies are dumped overboard, are stored on beaches and in all sorts of other places. They must withstand water, heat, cold, insects and all sorts of punishing handling.

Another problem that arises in the war grows out of the necessity of building stockpiles of food in all sorts of localities, in order that food may be available when and where the services need it. Most foods require better processing to meet these conditions

The chairman of the New England section of IFT, B. E. Proctor (left), Massachusetts Institute of Technology, discusses problems of Army feeding with Mr. Goss, of the Quartermaster Department.

R. H. Lueck (left), director of American Can Co. Research Laboratories, talks with E. H. Harvey, director of research, Anheuser Busch, and Lamar Kishlar, manager of research, Ralston Purina Co.

than is needed for civilian requirements. Some foods, including canned corn, pumpkin, sweet potatoes and tomatoes have been found unsuitable for shipment to the tropics. Finally, the weight and size of food packages for military use must be governed by transportation conditions and requirements.

Growing out of the unusual demands on United States food supplies, questions have arisen as to what effect restricted diets might have on national health. Dr. C. G. King, scientific director, The Nutrition Foundation, Inc., pointed out that restricted diets need not be deficient diets, if sufficient quantities of the right foods are made available. In spite of the high food intakes prevalent in the United States in peacetime, in comparison to the food consumed in many other countries, Dr. King stated that a large part of our population, perhaps as high as 90 percent, had been on suboptimum diets in the past. In Great Britain, where this condition also existed before the war, food restrictions have improved national health. The recent spectacular drop in infant mortality indicates that the same improvement may be found in the United States, particularly if control of food is governed by dictary needs rather than by political considerations.

Another phase of food in wartime was covered by Major V. O. Wodicka of the Quartermaster Corps subsistence laboratory, who discussed vitamin fortification and the stability of vitamins in foods. Fresh, unprocessed foods are largely unavailable in overseas areas where a large part of our armed forces must be fed. While the military authorities prefer to supply a nutritionally adequate diet from natural foods, in many areas there must be resort to fortification. Vitamin pills are only used as a third choice, when other sources are unavailable.

In supplying diets that are adequate nutritionally, consumer tastes must be considered. Most people, for example, prefer a bread made from the customary bland, stable white flour, rather than the more nutritionally perfect whole wheat breads, particularly when bread is consumed in quantity. Fortification is then employed.

With both natural vitamins and vitamin-fortified foods, the effects of storage on the stability of the vitamins must be considered. For example, these foods must withstand storage under severe conditions, as in hot climates or in deserts where the daily temperature range is great. The Army is now setting up to study the effect of this condition as compared to normal storage effects. This should indicate what foods to fortify, so that fortification will not be wasted on foods showing a high rate of vitamin loss.

Progress in Dehydration

In the year since reports on dehydration of foods were made at the food conference in Minneapolis in 1942, great progress in this method of food preservation has been made, as was brought out at one of the sessions in St. Louis.

W. B. Van Arsdel, Western Regional Research Laboratory, U. S. Department of Agriculture, discussed the tray and tunnel type of dehydrater, pointing out that most plants now operating use this equipment and cannot change now during the emergency. Therefore, improved knowledge of good operating technic is most needed at present. This industry is, however, unrestricted by tradition and can, after the war, develop such improvements as may be found necessary. Meanwhile, methods of preparation, spreading on trays, and washing of trays are among the points that can be bettered. Also, it is possible to equip tunnel dehydrating plants with finishing sections or finishing bins, and thus get a greater output from the tunnel. Where this is done, in connection with a center-exhaust tunnel or a combination of parallel- and counter-flow tunnels, three-stage dehydration, with resulting economy of operation, can be obtained.

For the future, it was indicated that general-purpose tunnels should be abandoned, as these are always a compromise and not suited to all products. Commercial dehydraters should be adapted to specific tasks. In addition, vacuum finishing was recommended.

Plant problems in vegetable dehydration were the subject of a talk by R. V. Tobin, field supervisor of dehydration for the Quartermaster Corps, who stated that proper raw material selection and storage must be the basis of successful plant operation. Selection and storage affect economy of preparation, loss through waste and quality of product. U. S. No. 1 quality gives less waste, increases efficiency of trimming lines and has better quality. In storage, both temperature and humidity must be controlled. Proper storage not only avoids waste of raw materials, but also keeps product in condition for economical peeling and trimming. Storage conditions should also be as clean as possible to prevent bacterial actions. In purchasing raw material, do so on a grade basis, check on adhering dirt and let the growers come to the plant so that they can see how conditions of raw material affects the operations.

Peeler losses must be watched, as

losses in peeling can run as high as 30 percent of the raw vegetable. Darkening after peeling results from long-time storage. Flame peeling, though high in first cost, gives good economy and low maintenance. Lye peeling and steam peeling are also promising. From 1½ to 2 cents per pound of dry product can be saved by economical peeling methods, along with a 30 to 50 percent increase in the volume of raw material handled per worker per hour and a reduction of 6 to 12 percent in waste. The cost of flame peeling is around $1.34 per ton of raw material and the cost of lye peeling is about $1.28 per ton.

Blanching problems were also discussed by Mr. Tobin, who favored pressure blanching and stated that the resulting cooked nature of the product was no drawback, and that this method does not retard drying except when the material is overblanched.

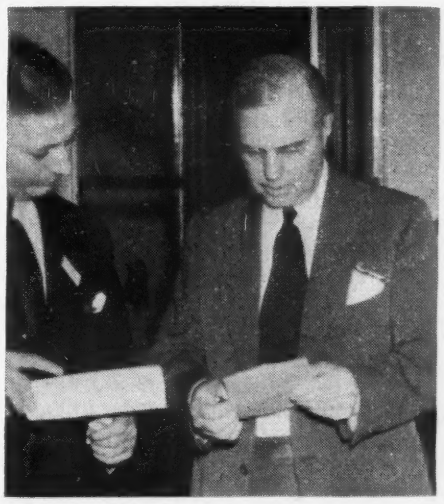
The newly developed methods for dehydration of meat were discussed by Dr. H. R. Kraybill, American Meat Institute, who pointed out that, when government purchase inquiries were first made in February, 1942, there were no commercial methods for carrying out this process. Now there are three successful methods, and thousands of pounds of the dry product, particularly pork, have been shipped. Specifications for the product were announced on July 1, 1942, and the first contract was let on July 30th, 1942. Present methods in commercial use all involve the dehydration of precooked meat in the ground state, by means of heated air. Drying of strips and pieces, also drying in a vacuum and drying of raw meat by sublimation of moisture from the frozen state, are now being developed. However, the precooked, air-dried ground meat provides a satisfactory food under war conditions, as it dries readily, refreshes easily, stores well and can be shipped in small space by compressing into cans. The storage temperature should be kept below 90 deg. F. if possible, because changes in flavor and color occur in the product above that temperature. At 70 deg. F. storage temperature, the product will keep at least a year in hermetically sealed cans. The nutritive value is about equal to that of ordinary cooked meat.

At this same session on dehydration, H. E. Goeresline, of the Bureau of Agricultural and Industrial Chemistry, U. S. Department of Agriculture, gave a clear and precise description of the process of spray-drying whole eggs. This was followed by a paper by Leo Best, G. F. Stewart and Belle Lowe, of the Iowa Agricultural Experiment Station, discussing some factors that affect the keeping quality of dried egg products. Pointing out that these products deteriorate at storage temperatures of 80 deg. F. or above, the paper outlined tests used to determine various types of deterioration.

Milk dehydration by spray and roller methods was also discussed by C. E. Gray, Golden State Co., Ltd., in a paper that stressed the design and operation of the equipment used.

Packaging and Containers

No subject is more important to food technologists during this war than that of providing the best available package or container for a food product. F. S. Leinbach, container division, WPB, outlined the effect of the war on the container situation, at the packaging session of the Institute. He stated that shortages of customary packaging materials have resulted in the development of greatly improved containers in many fields, citing fiber cans and paper shipping sacks as examples. War has made it necessary to put each available material to its best uses and only to use it where it is essential, resulting in what might be called a reduction to the irreducible minimum. Rules that will prove useful in the current packaging material situation, as suggested by the speaker were: (1) Do not overpack; package adequately but with no waste of material. (2) Use the largest sizes of containers that are practicable to conserve material. (3) Get maximum reuse from all sizes of containers that can be reused. (4) Send all waste kraft paper, after careful segregation of kinds, back to the paper manufacturer.



R. C. Newton (left), 1943 president of IFT and vice-president of Swift & Co., with G. J. Hucker, secretary-treasurer of the IFT.

E. H. Harvey (right), chairman of the St. Louis section of IFT talks with Whitman Rice, National Sugar Refining Co.

Containers for heat-sterilized foods were discussed by Dr. C. O. Ball, Owens-Illinois Can Co., who called attention to the fact that hermetic sealing and heat sterilization limits the choice of containers to all metal, all glass, or glass and metal combined. Plastic containers have not as yet proved to be successful. Glass containers can now be made thinner than was formerly the case and, with the limitations on varieties and sizes, more can be made from the same quantity of glass. It is expected that as many as 13,000,000,000 will be made in 1943. However, limitation on the metal available for closures serves to limit the expansion of glass container use. With metal cans it has also been necessary to limit the number of shapes and sizes, using larger containers whenever possible. Also, use of less tin in hot-dipped tinplate and substitution of electrolytically plated for hot-dipped tinplate has done much to save tin and make the supply go farther, as has also the use of specially treated steel, such as bonderized and enameled steel, to replace tinplate. Other savings made in metal can manufacture occur in the use of solders with lower tin content, and of plastics in flowing compounds to replace rubber.

Major V. d'A. Clark, Quartermaster Corps, spoke on the containers used for foreign shipments of Army food, stressing the great variety of conditions that these shipping containers must withstand. He also stated that, unless a pound of steel used in containers could save 3¼ cu. ft. of space, the steel should be used in ship building rather than in making containers. Square or rectangular containers save 20 percent of space in comparison with cylindrical containers. Containers with fiber bodies and metal ends are giving some help, but are, in general, too weak and must be used with shipping cases provided with dividers or other supports. Among other newly developed containers proving useful are wax-dipped and asphalt-dipped containers, the bag-in-box container and the 3-in-1 containers used for dehydrated vegetables. Among the great needs are adhesives suitable for sealing containers and shipping cases adequately.

(Turn to page 135)

This Is What It Costs To Dehydrate Vegetables

W. D. RAMAGE and C. L. RASMUSSEN
Western Regional Research Laboratory, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture, Albany, Calif.

PART I — Buildings, plant layout, capital investment. Not only are costs given for plants of 25 to 100 tons daily capacity but good plant layouts are illustrated and operating practices discussed

THERE ARE two aspects to the study of vegetable dehydration costs that should be considered separately to permit proper evaluation of the many factors involved. One phase covers the capital investment and plant layout, which is the subject of the present discussion. The other phase is concerned with labor requirements and the day-to-day operating expenses that may be designated as processing costs. They include raw material, labor, utility, packaging and incidental costs, and will be discussed in a subsequent article.

The day-to-day charges are by far the greater. In many cases the cost of raw material, labor and packaging supplies for only one month will amount to more than the total initial outlay for plant and equipment. Capital investment should, nevertheless, be given most careful consideration. The type of building, kind of equipment and plant layout have a very decided effect on the efficient operation of any dehydration plant.

A plant that is not set up to make the most efficient use of labor, equipment and floor space, and to handle raw materials without damage and waste, may have such high operating costs that it will not be able to operate profitably. Proper plant layout is one of the most important factors in keeping operating costs of a dehydrating plant at a minimum.

The various units of a dehydration plant must work together as an integrated whole. A properly planned dehydration plant is not built around a particular piece of equipment nor around a certain step in the process. The different operations must be balanced, with no "bottlenecks." To accomplish this, the capacity of each piece of equipment should be somewhat flexible so that an operating balance can be secured without seriously impairing the efficiency of any part of the plant. New plants should be completely engineered before construction begins. Otherwise, costly changes may be required later.

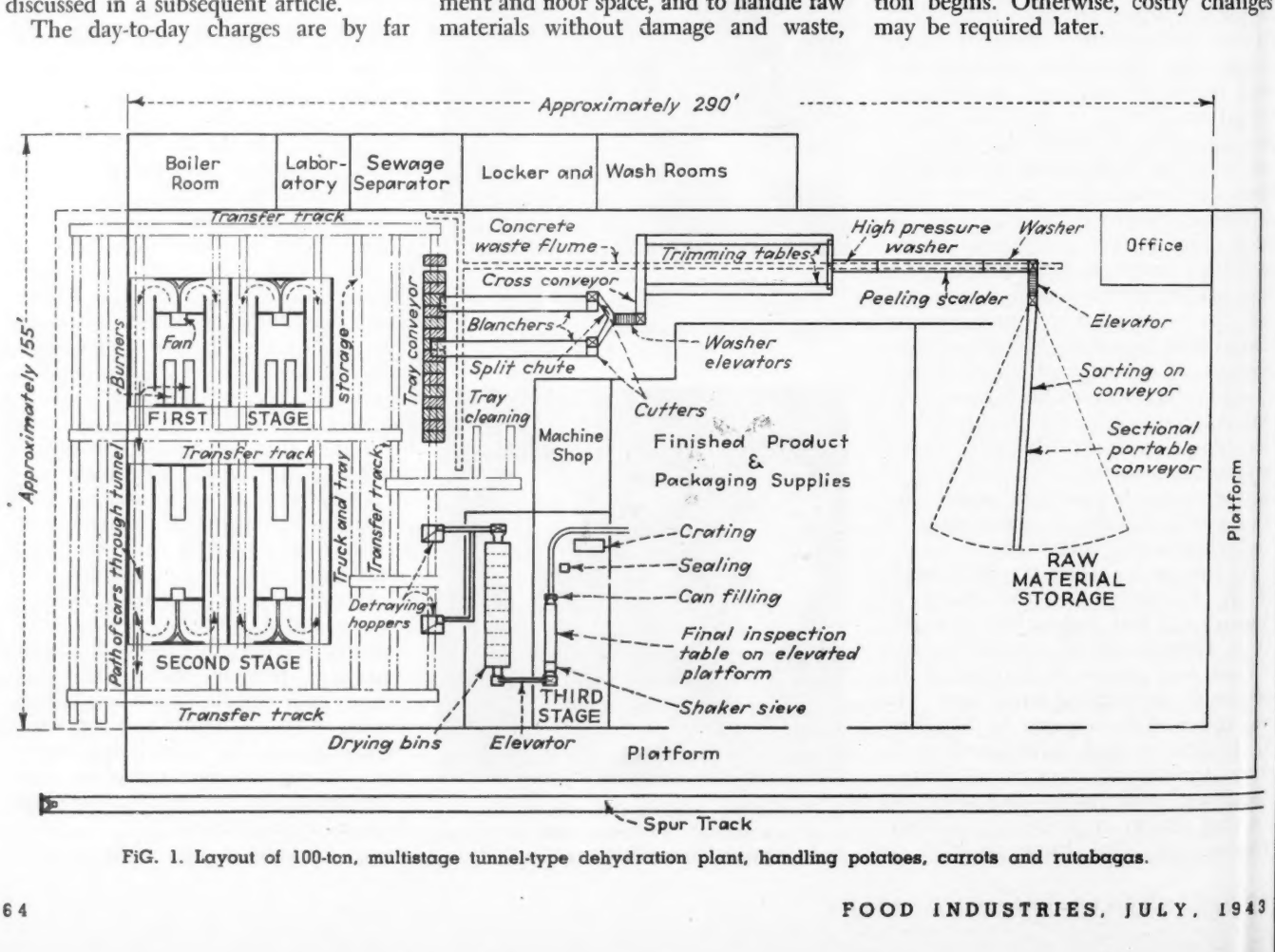


FiG. 1. Layout of 100-ton, multistage tunnel-type dehydration plant, handling potatoes, carrots and rutabagas.

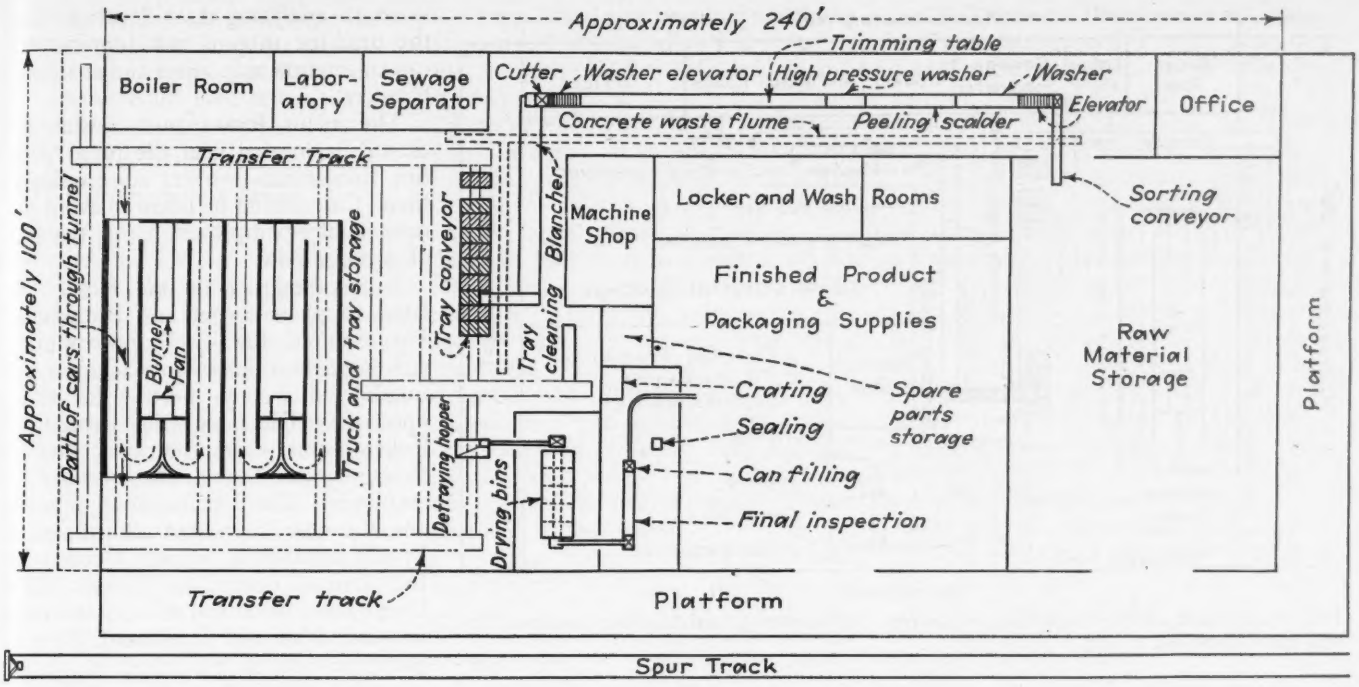


FIG. 2. Layout of 50-ton, counterflow tunnel-type dehydration plant, handling potatoes, carrots and rutabagas.

The present discussion is limited to commercial plants in the capacity range of 25 to 100 tons per day, unprepared basis, and most of the statements are equally true for larger plants. Figures 1 to 5 show illustrative floor plans, which are considered later in more detail.

Each prospective dehydrator will have his individual preference concerning many features of layout, construction and operation. The equipment, the layouts and the operating steps outlined herein are offered merely as constructive suggestions of what a workable dehydration plant may include. Many important points have not been illustrated in the accompanying floor plans because custom tailoring is necessary in almost every case.

Those omitted include operations such as air desiccation, grinding, storing of raw material or finished product under special conditions, preparing the product in special forms (e.g., riced potatoes) and numerous new technics still unproved on a commercial scale.

Dehydration plants much smaller than 25 tons per day are not usually in a commercially competitive position unless they have some special advantages, such as low-cost raw material or low-cost labor. Small plants, operating as community projects or on individual farms, often justify themselves by making possible the saving of crops which have no ready market or as a community service. Their value in wartime is limited by the fact that the output per unit of operating labor and construction materials is low.

Building and Plant Layout

The building need not be expensive, but certain features are essential. It must have good concrete floors throughout and proper drainage so that walls and floors can be washed down and kept clean. Built-in waste flumes in the floor of the preparation room are an aid in this respect. All outside openings should be screened so that flies and other insects cannot enter, and outside screen doors should have automatic closing devices. Rodent-proof construction is highly desirable.

The plant layouts presented here show practical floor plans and will serve as guides to floor-space requirements and arrangements for the different operations. Buildings of rectangular shape are used for illustrations because they are a commonly used type. When the plant is to be located in existing buildings, the layout must be modified to take advantage of the available space in the best manner.

In some cases it may not be feasible to locate all parts of the plant within the limits of a rectangular building. Boiler and sewage separation rooms can be conveniently located in small adjoining buildings, or in an extension of the main building. It may be advisable to place the office in a position overlooking the receiving and shipping platform for convenience in keeping receiving and shipping records and checking the movement of all materials in and out of the plant.

Raw material storage must be located conveniently to the receiving platform. It should be dry, well ventilated and cool. Refrigeration will be necessary in many cases. The size of the storage room is governed mainly by regularity of raw-material delivery. Where the plant is located close to adequate supplies and harvest is continuous, a smaller storage room is necessary than where supplies are hauled long distances or harvest is irregular. Storage requirements vary with the product. Perhaps as much as ten days' supply of potatoes, sweet potatoes and onions can be kept on hand, since these products do not deteriorate in that time, but in many cases not more than a day's supply will be necessary. Cabbage, carrots, rutabagas and beets are usually harvested as they are needed, but since rains delay the harvest of these vegetables, many operators believe they should keep at least ten days' supply on hand. Others say that it is not advisable to keep over two or three days' supply since these vegetables show signs of wilt after that period. A one days' supply of leafy vegetables is the most that should be kept on hand unless cool storage is available. Bulk storage may be necessary if there is a shortage of sacks and boxes. This will decrease the amount of space needed but will either complicate the handling problem or necessitate special storage facilities.

The storage space for finished product and packaging supplies must be dry, cool and insect- and rodent-proof, and should be adjacent to the packaging room and the shipping platform. The regularity of outgoing shipments is an

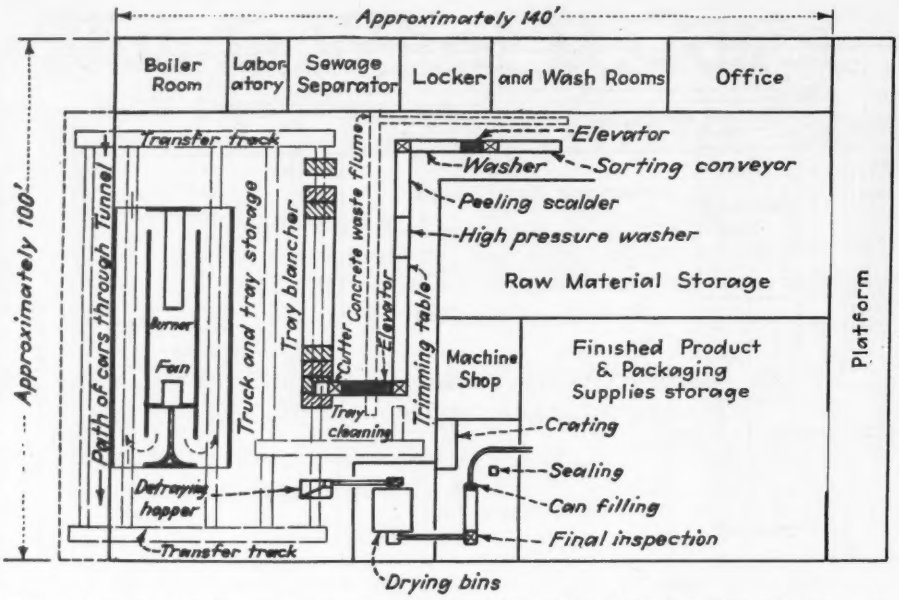


FIG. 3. Layout of 25-ton counterflow tunnel-type dehydration plant, handling potatoes, carrots and rutabagas.

important factor in determining the size of the finished storage room. The availability of packaging supplies is another factor to consider. Small packages of consumer goods require from two to three times as much storage space as large packages such as 5-gal. cans.

It is advisable to have additional storage space in adjoining buildings or on mezzanine floors to take care of unforeseen storage needs, and it may be desirable to provide clear space around the building. This space can be used for movement of trucks and additional temporary storage in emergencies.

Tunnel dryers require considerable floor space because of the need for transfer tracks, car tracks, car and tray storage, tray washing and tray conveyors used in loading the product on trays. The conveyor-type dryer, such as the one illustrated here, requires relatively little floor space in addition to that occupied by the dryer itself. Through-circulation of air in the dryer allows a heavy loading on the belt, thus reducing the size of the belt and minimizing needed floor space.

For tray-type dryers, adequate storage for cars and trays must be provided. A covered platform alongside the tunnel on the outside of the building provides an inexpensive storage space. Facilities for washing or cleaning trays must be provided. Ample floor space and proper tools are necessary.

The laboratory may be conveniently located near the preparation line and the packaging room, but this is not essential. The time spent in getting a sample is only a fraction of the time spent in analyzing it. A location near the machine shop is not desirable because vibration may affect the analytical balances.

The main locker and washrooms should be located near the preparation line since many workers are employed there. Care should be taken to avoid the movement of employees across the line of product flow.

Labor requirements are closely related to plant layout and equipment. For example, the length of trimming and inspection belts depends upon the number of women needed for these operations. The floor space needed for locker rooms, aisles, stairways, and so forth, depends upon the number of employees. The spacing of equipment and the flow of product are influenced by the number of workers needed for the various operations. Proper plant layout saves space and reduces the need for some labor and equipment. Flow of products through the plant in a manner that eliminates cross traffic decreases the amount of labor required. Elevators and conveyors also save labor. In many instances, the use of gravity flow will decrease the required number of employees, and will eliminate elevators and conveyors at some points.

The work in the machine shop will consist mainly of repair of trays and adjustment and maintenance of preparation equipment. This shop should be located so as to require the least movement of the items to be repaired. Some machines are too large to take to the machine shop, and it is necessary to allow for working space alongside this equipment or provide for its removal to the outside. In many cases, equipment is shipped to the manufacturer for repairs. Storage space should be provided for spare parts and equipment and supplies.

TABLE I—Approximate Floor-space requirements in Square Feet for Dehydration Plants of Various Sizes.

Handling Potatoes, Carrots, Rutabagas, or Sweet Potatoes

Item of plant	100-ton plant [1]		50-ton plant [1]		25-ton plant [1]		Approximate floor space allowed in accompanying sketches			
	Low [2]	High	Low [2]	High	Low [2]	High	100-ton tunnel	50-ton tunnel	25-ton Tunnel	25-ton Conveyor
Raw material storage [3]	8,000	16,000	4,000	8,000	2,000	4,000	8,600	4,600	2,600	2,500
Finished-product and packaging-supplies storage [4]	6,000	12,000	3,000	6,000	2,000	3,500	8,500	4,600	2,900	2,500
Preparation	4,000	6,500	2,500	3,500	1,500	2,500	6,000	3,200	1,800	2,100
Drying	8,000	14,000	5,000	8,000	2,500	5,000	13,000	7,800	4,000	2,600
Packaging	800	1,000	500	800	400	600	1,000	700	500	500
Boiler room	500	1,500	400	1,000	200	600	800	500	300	500
Laboratory	300	500	200	400	100	200	400	300	150	150
Locker and wash rooms	1,500	2,500	1,000	1,500	500	1,000	1,800	1,100	700	700
Office	500	750	400	600	300	500	600	500	450	400
Machine shop and tray repair	500	1,000	400	800	200	400	700	500	300	200
Sewerage [5]	500	1,000	400	600	200	300	600	400	300	250
Total	30,600	56,750	17,800	31,200	9,900	18,600	42,000	24,200	14,000	12,400

[1] Capacity given in tons per 24 hours, unprepared basis.

[2] The low limits of floor space will be undesirable in many instances. The high limits will usually be adequate under the conditions outlined.

[3] The space indicated for raw-material storage will provide for two to three days' supply of root vegetables in sacks or boxes. Additional space must be provided if a larger supply of raw material is to be kept on hand. If it is not feasible to have this much storage space in one building, adjoining buildings or covered platforms can be used.

[4] Additional storage space, 50 percent or more of that indicated here, should be provided on mezzanine floors or in separate buildings. This space can be used for storage of chemicals, spare equipment and the many other items that accumulate. Very few plants have adequate storage space.

[5] In many instances, no space will need to be allocated for sewerage. Such space as is indicated here is for settling and separation of solids from the liquid wastes and for handling trimmings from the preparation line.

On the basis of actual floor space in operating plants and an objective appraisal of the adequacy of these allowances, approximate floor space requirements for various parts of the plant are given in Table I.

Preparation Line

Figure 5 presents the layout of the preparation line for the 100-ton plant. Both the side elevation and floor plan are shown. The line need not be straight; it can be turned at any one of a number of convenient places, as illustrated in Figures 1 to 4.

Plants processing potatoes have been selected for illustration. Other vegetables—for example, carrots and rutabagas—can be handled on the preparation lines illustrated with little or no change. Sweet potatoes can be handled if lye peeling is used. The use of the lye peeler as a scalder also enables the lines to operate on tomatoes almost as outlined. Other vegetables may require considerable change in these lines. Beets are sometimes cooked before peeling, thus necessitating an autoclave. Cabbage requires the use of kraut cutters and the addition of coring machines over a suitable conveyor belt; considerable rearrangement and a different type of blancher are also necessary because of the desirability of blanching on trays.

Only properly designed and carefully built machinery should be used. A poor cutter or slicer may cause damage to the product and increase washing losses. Incomplete peeling necessitates excessive trimming labor, and drastic peeling wastes the product. The cost of a good blancher and its operating costs are small compared to the loss which will be incurred by the use of a poorly designed blancher. Improperly designed elevators, conveyors and washers may be too rough in their action, resulting in damage to the products.

Some vegetables do not handle well on elevators or conveyors. This is especially true of leafy vegetables. The plant should therefore be arranged to give these vegetables a minimum amount of handling.

Ruggedness is an important characteristic in plant equipment. Equipment should be built so as to have a long operating life. High initial cost is justified if it results in a minimum of repairs and replacements. High maintenance charges soon offset any saving due to low initial investment. Repairs cause much grief and expense due to interruption of production and improper handling and processing of the product. It is an axiom that the price of a good machine is forgotten long before it wears out.

Where there is a possibility that the stopping of any machine will interrupt the continuous flow of the product through the plant, some means of substitute operation should be available or else there should be storage facilities for the product so that it will not deteriorate while standing unprotected. In the larger plants, it may be justifiable to provide two of almost all the major items of equipment. Two or even three trimming belts are preferable to one from an operating standpoint and because of the possibility of a breakdown. It may be desirable to provide two smaller blanchers instead of a single large one. This has particular value when two products are run simultaneously or a product is being prepared in two forms.

Oversize equipment may be a wise investment. Various points along the preparation line are then able to handle increases in throughput as a result of improvement in the quality of the raw material or changes in labor and equipment.

On the other hand, much can be done to reduce the investment in processing equipment. The number of elevators and conveyors can be reduced by placing some machines on elevated platforms directly over other machines, thus utilizing gravity flow. This also reduces the floor space required. A properly constructed water spray over the front uncovered section of the blancher belt may be satisfactorily wash the product in lieu of an expensive separate mechanical washer. In addition, a water spray at this point tends to prevent excessive humidity in the preparation room by condensing steam escaping from the front end of the blancher. Elimination of all unnecessary handling of the material reduces the amount of labor and equipment needed and results in a better finished product. A carefully laid-out plant is essential to insure a minimum of handling and the most efficient use of labor and equipment.

The series of operating steps considered below is standard procedure in many dehydration plants. There are numerous variations, some of which have advantages over those outlined. Most of these are, however, either more complicated or involve unroved technics. The following steps have been proved by actual practice and are known to be satisfactory in operation. The discussion concerns potatoes, but may apply equally well to several other vegetables as indicated above.

Feeding to Preparation Line. The simplest method of feed to the preparation line employs men using hand trucks. A long portable conveyor may save considerable labor. The sacks are opened at the place of storage and potatoes are poured directly into the conveyor and preliminary sorting may be done here. Presizing is sometimes done before the potatoes are fed to the preparation line.

A large hopper or soaker washer is useful at the beginning of the preparation line. Here a supply of the raw material can be kept in order to obtain a uniform flow of product along the line. A uniform flow insures more efficient operation and requires smaller equipment.

Operators have found it difficult to keep the areas around the front end of the preparation line clean. Dirty product and dirty sacks and boxes all contribute to the mess. Cleaning facilities here should be adequate to cope with this problem. Much of the trouble can be eliminated by having

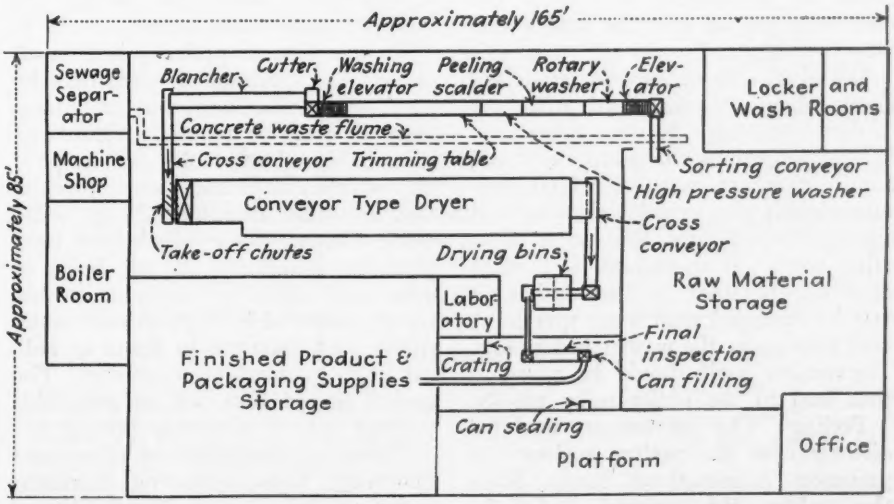


FIG. 4. Layout of 25-ton, conveyor-type dehydration plant, handling potatoes, carrots and rutabagas.

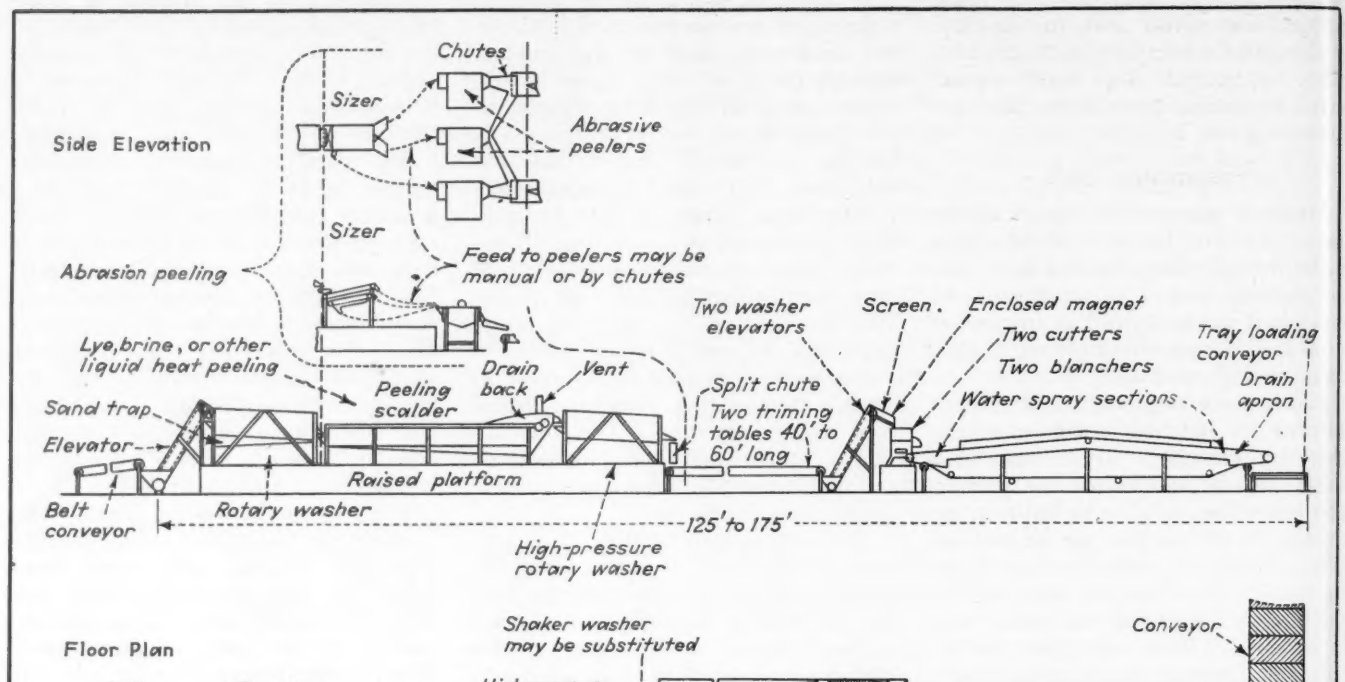


FIG. 5. Preparation equipment layout for 100-ton dehydration plant handling potatoes, carrots, rutabagas and sweet potatoes.

the product washed or cleaned in a precleaner located outside the building, on the receiving platform or in the storage room. Sand or dirt from the product is particularly annoying because it clogs up the drains and sewers. A shaker or brush dry-cleaner located ahead of the washer will keep the sand from getting into the washer and into the drains.

Washing. Some raw materials are clean when delivered and need no further washing before processing. Others come into the plant dirty and require thorough washing. High-pressure washers give superior cleaning and are reputed to use less water than other types. If an elevator is used to raise the potatoes to the washer, it may be equipped with water sprays. A sand trap under the washer is desirable. The washer itself should be raised so that feed to the peeler is by gravity.

Peeling. The potatoes are next fed directly into the peeling scalder. A preheater is sometimes used. From the scalder, the material is fed by gravity to a rotary high-pressure washer which removes the loosened skin. Shaker or tumbler washers are sometimes preferred for this purpose.

It is desirable in most instances to provide for presizing if abrasion peeling is used. The drawing of the preparation line illustrates this roughly. As a rule, no further washing is necessary at this point since the peelers are equipped with water sprays.

No one type of peeler is best in all cases. Lye peeling, if permitted by purchase specifications, can be advantageously used on carrots, potatoes and other hard root vegetables. Other peeling methods have also shown promise and are used commercially in some cases. Among those which have been tried are immersion in salt brine or other hot liquid or exposure to hot vapors, followed by high-pressure water sprays, and exposure to flame or radiant heat, followed by scrubbing. The peelers should turn out an acceptable product, give a minimum peeling loss and require a minimum of subsequent trimming, thus decreasing trimming losses and labor costs. Availability of the peeler may be the controlling factor.

Trimming. Many types of trimming belts are available. The "merry-go-round" feature has proved very popular. The product is brought around again to the trimmers if it is missed the first time. Additional belts to carry the trimmings away are advisable.

It is preferable to allow about 3 ft. of space for each worker on the trimming belt. It is possible to operate with only 30 in. with some crowding, but it is not desirable to plan on this basis. The larger allowance makes possible the addition of extra workers if needed.

Cutting. The elevators feeding to the cutters may be equipped with water sprays. A screen should be provided to allow bolts, nuts and small rocks to drop out before the product enters the cutters. A magnet can be used to take out knives accidentally droped on the trimming belts. Much damage and lost time can be avoided by such simple precautions.

Blanching. Blanching can be accomplished (1) on trays in a cabinet or retort, or on a tray conveyor, or (2) on a belt. The former requires

trays that can stand such treatment, preferably metal, and careful design to assure good steam distribution. The blancher belt for the latter method may be wire mesh or perforated sheet metal.

Many operators prefer to blanch cabbage on trays because the blanched cabbage is subject to mechanical damage, and rehandling tends to cause matting. A continuous blancher with a wire mesh belt is not always suitable for diced products because the pieces tend to stick in the meshes.

Spreading on trays or a belt may be done manually or by mechanical means such has reveloving brushes or drums, stationary bars (straight, angular or curved), or vibrators and shakers. Blanching on trays eliminates one spreading operation but requires a larger blancher area because of the lighter unit loading. This procedure is illustrated in Fig. 3.

Waste Disposal. Disposal of waste is a very important and sometimes costly factor, especially in the larger plants where the waste may amount to 25 or more tons per day. Several dehydration plants have been closed because of inadequate facilities for disposing of such wastes. The problems involved should be thoroughly explored before setting up a dehydration plant, and there must be positive assurance that sewage can be disposed of in a manner acceptable to all concerned. The loss resulting from a shut-down plant is sufficient evidence of the necessity for careful consideration and planning to avoid such occurrences.

Dehydrater

Choice of Dryer. Three types of vegetable dehydraters are shown in Figs. 1, 2, 3 and 4. Figure 1 shows a plant capable of handling 100 tons of raw product per day, in continuous operation. The dehydrater is of the multistage tunnel type. Figures 2 and 3 show 50- and 25-ton plants using dehydraters of the counterflow tunnel type, and Fig. 4 represents a 25-ton plant using a conveyor type dryer. All are planned to utilize finishing bins.

This presentation of different types of dehydraters in different sizes of plants is not meant to imply that a multistage unit is better for a 100-ton plant and a conveyor type dryer for a 25-ton plant. The examples discussed are for illustrative purposes only and it is probable that each of these types will be used in the future in a wide range of plant capacities. The capacities indicated are only nominal; the true capacity of each is dependent upon the product, the dryer design, heat input, air circulation and the use of finishing bins. The dehydraters shown in the illustration are suitable for use on potatoes, carrots and rutabagas. Because of the long drying time of sweet potatoes, considerably more tray or conveyor area will be necessary to obtain the capacities indicated.

In the multistage dryer, the material passes first through a short parallel-flow tunnel, then through a longer counterflow tunnel, and finally into finishing bins. If properly designed, this is a very flexible type of unit, permitting the adjustment of drying conditions to the optimum for product quality. The second-stage tunnels, used alone, are suitable for fruit drying.

The counterflow tunnels illustrated in the 50- and 25-ton plants are a conventional type. Drying times are not as short as in multistage units because the maximum temperature of the air is limited by the highest temperature which the product at the dry end can stand. The use of finishing bins, permitting removal of the product from the tunnels at a higher moisture content, partially offsets this drawback.

The type of unit illustrated in the 25-ton plant, using a conveyor dryer, has shown promise in commercial operation and undoubtedly will be used increasingly as its operating problems are overcome.

The operation of plants smaller than those handling 25 tons per day is likely to be intermittent, and batch-type dryers or tunnels smaller than the usual commercial type may therefore be preferable. The use of tunnel-type dryers in a discontinuous operation is feasible only if close control of temperature and humidity is maintained during the starting-up and shutting-down periods.

The choice of a dryer may be influenced by the amount of labor required for its operation. If tray-type dryers are used, all practical labor-saving methods and devices should be installed. Conveyor dryers require less labor. Tray handling and washing may entail a considerable amount of hand labor, whereas belt cleaning may be almost entirely automatic. Where labor rates are high, the rehandling costs involved in multistage drying may be sufficient to cause a reconsideration of

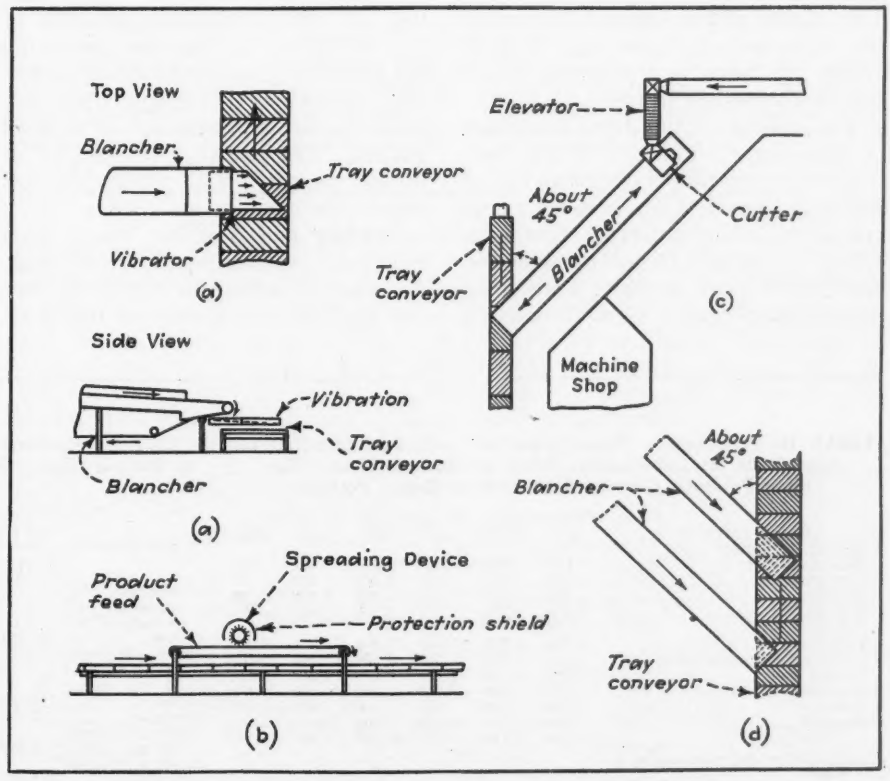


FIG. 6. Various models of automatically spreading product on trays.

a Vibrator or shaker type of spreader.
b Spreader utilizing spreading belt located above trays. The spreading device may be a stationary bar, straight, curved or angular, or it may be a revolving drum with brush bristles, fingers or other suitable protuberances. The product is fed from end of blancher either parallel or at right angles. The movement of the trays is synchronized with the movement of the spreading belt.
c Method to take advantage of uniform spreading on blancher belt. A 4-ft. blancher will spread evenly across 3-ft. trays, at approximately a 45 deg. angle. This layout is designed to fit into floor plan shown in Fig. 2.
d Method to take advantage of uniform spreading on blancher belts. Two blanchers, each 4 ft. wide, will spread evenly across 6-ft. trays at approximately a 45 deg. angle.

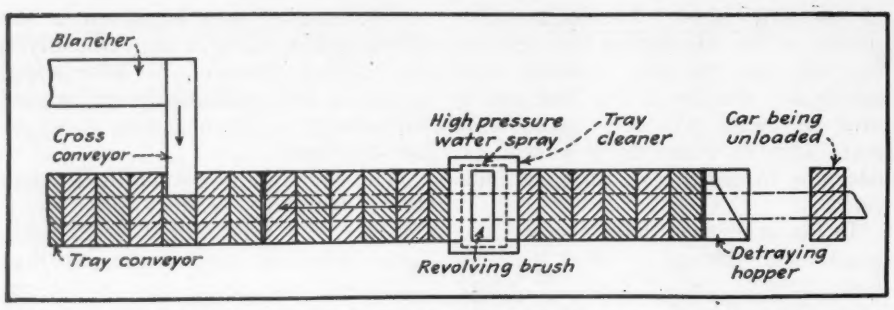


FIG. 7. Layout of tray line to avoid excessive handling of trays between unloading and loading.

the drying system to be installed. Automatic movement of the cars in and between the tunnels may overcome this disadvantage.

The lower labor cost in operating a conveyor-type dryer may offset the higher initial capital cost. The output per dollar of investment for a conveyor-type dehydrater is generally less than for a tunnel dryer. It may not be possible, however, to determine which type is preferable on the basis of cost alone. It is probable that the choice will be determined mainly from a technological viewpoint, but it may depend also upon the availability of the necessary construction materials. The quality of the product, the quantity of output and the relative availability of labor and materials likely will be controlling factors.

The upkeep of the dryer is an item of importance. The cost of maintaining the trays in proper condition can be balanced against the upkeep of a large and costly belt or conveyor. Here again, a first investment is not the last one, and better trays or belts have lower maintenance costs. Careful handling and proper maintenance lengthen the life of either type of equipment.

Ample capacity in the dehydrater is usually a good investment. Since the fuel and power costs are relatively low, an increase or decrease of even a substantial percentage dose not seriously affect the total processing cost. Increased labor costs due to inefficient use of labor in the preparation line when the dehydrater is unable to handle the output of the line usually amounts to far more than any additional drying cost resulting from the use of a slightly oversize dehydrater.

Finishing bins used in conjunction with the dehydrater permit full utilization of the evaporative capacity of the dehydrater proper by shortening the time of the main drying operation. This shortening of drying time may result in an improvement in product quality. The overall cost per unit of drying capacity will usually be less when finishing bins are used.

Loading and Stacking Trays. One tray line should ordinarily be adequate for plants handling well over 50 tons per day. Proper timing of tray loading, stacking, drying and tray scraping is essential for efficient operation. This is especially true for large plants. A minimum of about 10 to 12 seconds should be allowed for handling each tray while stacking on cars. On this basis, the 100-ton plant is near the upper limit for one tray line. It should be borne in mind that if the rate is increased so that the handling time is less than 10 to 12 seconds per tray or if the flow of product is not uniform, two tray lines will be necessary.

Spreading the product on trays is slightly more difficult than spreading on a flat belt, because the sides of the trays are higher than the material. Leafy vegetables, such as nonblanched shredded cabbage, are an exception since this material is stacked higher than the sides of the trays. Several suggested means of spreading on trays are sketched in Fig. 6.

It is important that tray handling be avoided wherever feasible. One possibility is illustrated in Fig. 7. After the trays are scraped and dumped, they are placed immediately on the tray conveyor which takes them back to be loaded again. Tray cleaning can be accomplished on this conveyor by means of high-pressure, hot-water sprays, revolving brushes, and so forth. A car standing alongside the conveyor can be used to furnish extra trays when necessary. Two conveyors in series, the first running at a faster speed, help to maintian a continuous line of trays for loading. If this system is used, tray scraping and tray loading must be coordinated for efficient operation.

Some operators have found it neces-

TABLE II—Preparation, Final Inspection and Packaging Equipment Costs for Dehydration Plants of Various Sizes. Handling Potatoes, Carrots, Rutabagas or Sweet Potatoes

Item of equipment	100 tons per day [1] Low	100 tons per day [1] High	50 tons per day [1] Low	50 tons per day [1] High	25 tons per day [1] Low	25 tons per day [1] High
Preparation equipment						
Hand trucks	$100	$200	$100	$150	$50	$100
Conveyors	1,000	1,500	800	1,000	500	800
Elevators	800	1,000	600	800	500	700
Washers	1,100	1,400	1,000	1,200	600	800
Peelers						
Peeling scalders	2,500	3,000	1,500	2,000	1,000	1,500
High-pressure washers and pumps	2,500	3,000	1,500	2,500	1,000	2,000
Trimming belts	4,000	8,000	2,000	4,000	1,500	3,000
Conveyors and elevators	1,500	2,000	800	1,200	600	1,000
Cutters	1,500	2,500	800	1,300	800	1,300
Blancher	6,000	10,000	3,000	5,000	2,000	3,000
Total	21,000	32,600	12,100	19,150	8,550	14,200
Final inspection and packaging equipment						
Hopper and shaker sieve	500	500	500	500	400	400
Inspection belts	1,000	1,400	600	1,000	400	600
Hopper and scales	200	300	100	200	100	200
Can sealer (year's rental and incidentals)	200	200	200	200	200	200
Roller conveyor	400	600	250	500	200	400
Hand trucks	50	100	50	100	25	50
Tools	200	300	100	200	75	150
Totals	2,550	3,400	1,800	2,700	1,400	2,000
Equipment total	23,550	36,000	13,900	21,850	9,950	16,200
Approximate installation costs (25% of equipment)	5,850	9,000	3,500	5,450	2,450	4,100
Grand total	$29,400	$45,000	$17,400	$27,300	$12,400	$20,300

[1] Unprepared basis.

TABLE III—Building and Equipment Costs for Dehydration Plants of Various Sizes. Handling Potatoes, Carrots, Rutabagas or Sweet Potatoes [1]

Item of plant	100 tons per day, multistage tunnel type Low	100 tons per day, multistage tunnel type High	50 tons per day, counterflow tunnel type Low	50 tons per day, counterflow tunnel type High	25 tons per day, counterflow tunnel type Low	25 tons per day, counterflow tunnel type High	25 tons per day conveyor type Low	25 tons per day conveyor type High
Preparation, final inspection and packaging equipment	$30,000	$45,000	$18,000	$30,000	$12,500	$20,000	$12,500	$20,000
Drying equipment	50,000	60,000	25,000	30,000	20,000	15,000	30,000	35,000
Building space at $1 per square foot	30,000	55,000	18,000	31,000	11,000	19,000	10,000	17,000
Sewerage	3,000	4,000	2,000	3,000	1,000	2,000	1,000	2,000
Office and laboratory equipment	1,000	3,000	500	2,000	500	1,000	500	1,000
Boiler and equipment [2]	9,000	13,000	6,000	9,000	4,000	6,000	9,000	13,000
Total	$123,000	$180,000	$69,500	$105,000	$41,000	$63,000	$63,000	$88,000
Cost per ton of daily capacity (unprepared basis)	$1,230	$1,800	$1,390	$2,100	$1,640	$2,520	$2,520	$3,520

[1] See discussion under "choice of dryer" concerning dehydrater capacity on sweet potatoes.

[2] The boiler capacities for the plants using tunnel dryers are based upon the use of direct heat in the dehydrater. Steam for air heating is assumed in the conveyor-type dryer, necessitating a much larger boiler per unit of plant capacity. Aside from the dehydrater proper, it is assumed that blanching, cleanup and incidental steam requirements will be at least 2 b. hp. (actual) per ton of raw material handled daily.

sary, when using wooden trays, to soak them before they are washed in order to obtain satisfactory cleaning. Trays so washed must be dried under proper conditions to avoid checking damage. It is desirable to dry the trays before reloading so that the large amount of water carried in the wet wood will not cause an increase in the drying time and a corresponding decrease in quality of the vegetables being processed.

Packaging Room

The packaging room should be enclosed, thus excluding damp air from the preparation room and dehydrater. Air-desiccating equipment is advisable in many cases. If a refrigeration system already is available, desiccation based upon refrigeration can be used. Where no such equipment exists, non-refrigerative types are generally installed. When a product is dried to an extremely low moisture content, desiccation of air is essential and will more than pay for itself in improving the quality of the packaged material.

Where a shaker-sieve is employed to remove the fines from the dried product, the economical use of these fines is a problem. If the quantity is large, installation of grinding equipment may be advisable. The necessity for grinding equipment also depends largely upon the demand for soup stocks, purees and seasonings. Onions, celery and garlic have been quite generally prepared in powder form, and powdering equipment will probably continue to find its greatest use for these vegetables. An extremely dry product and dry air are essential in any powdering operation.

Plant and Equipment Costs

The cost of the building and equipment vary considerably. The construction of new buildings or the use or rental of old buildings, the purchase of new or second-hand machinery, and the wide variation possible in the type and size of each item of equipment are factors that make an overall estimate unreliable in many cases. As a guide, however, Tables II and III have been prepared. Table II presents rough cost estimates for the preparation, final inspection and packaging equipment indicated in Figs. 1 to 5. Table III gives the approximate costs of constructing and equipping these same plants, including all usual items of plant.

The overall costs, as given, vary from $1,200 to $3,500 per ton of daily capacity, unprepared basis, depending upon the size and type of plant and the low-high limits upon which the estimates are based. The low cost of $1,200 for the 100-ton plant and the low limits for the other sizes cannot be considered practical since they are a summation of the low estimates for the items of equipment. There is only a remote likelihood that any plant will or should be constructed at a minimum cost for all items. Unless constructed under unusual circumstances, such a plant would probably have operating difficulties due to lack of equipment and limited floor space. Dehydration plants should be balanced units, and the costs of various parts will be low or high in accordance with the circumstances affecting each particular machine, operation or floor-space-requirement.

These costs must be considered as only very rough estimates since they

(*Turn to page 137*)

TABLE IV—Capacities Per Unit of Time in a Vegetable Dehydration Plant Capable of Handling 50 Tons Per Day, Unprepared Basis.

Form prepared	Table beets (slices)	Cabbage (shreds)	Carrots (cubes)	Onions (slices)	Potatoes (strips)	Sweet potatoes (slices)	Ruta-bagas (slices)
Unprepared basis							
Pounds per day	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Pounds per hour (operating 21 hours per day)	4,750	4,750	4,750	4,750	4,750	4,750	4,750
Pounds per minute	79	79	79	79	79	79	79
Number of women coring (estimated)	.....	6	.....	.....	.....	.....	.....
Pounds per woman per minute	.....	13	.....	.....	.....	.....	.....
Prepared basis							
Assumed culling, peeling and trimming loss	25%	30%	20%	10%	20%	25%	15%
Tons per day	37½	35	40	45	40	37½	42½
Pounds per hour (operating 21 hours per day)	3,570	3,330	3,810	4,290	3,810	3,570	4,050
Pounds per minute	60	56	64	72	64	60	68
Number of women trimming (estimated)	20	.....	20	30	40	30	20
Pounds per woman per minute	3.0	.....	3.2	2.4	1.6	2.0	3.4
Assumed blancher loading (pounds per square foot)[1]	Pre-cooked whole	2	4	Not blanched	4	4	4
Assumed blanching time in minutes		3	6		6	6	6
Pounds in blancher at any one time[2]		170	380		380	360	405
Square feet of active blancher surface		85	95		95	90	100
Assumed tray loading (pounds per square foot)	1.4	1.0	1.5	1.25	1.25	1.25	1.4
Pounds per 3x6-ft. tray	25	18	27	22.5	22.5	22.5	25
Pounds per 22-tray car	550	395	595	495	495	495	550
Cars per hour[2]	6.5	8.4	6.4	8.7	7.7	7.2	7.4
Minutes per car	9.2	7.1	9.4	6.9	7.8	8.3	8.1
Trays per hour[2]	143	185	141	191	169	158	163
Trays per minute	2.4	3.1	2.4	3.2	2.8	2.6	2.7
Seconds per tray	25	19	25	19	21	23	22
Active length of blancher (6 ft. wide, product blanched on 3x6-ft. trays, blanching time and tray loading as above), approximate feet	.....	30	45	.....	50	50	50
Dried basis							
Assumed overall shrinkage ratio	13 to 1	19 to 1	10 to 1	14 to 1	7 to 1	4½ to 1	10 to 1
Pounds per day	7,700	5,300	10,000	7,100	14,300	22,200	10,000
Pounds per hour (operating 21 hours per day)	365	250	475	340	680	1,060	475
Pounds per minute	6.1	4.2	7.9	5.7	11.3	17.7	7.9
Pounds per 5-gal. can (estimated)	10	6	14	9	10	13	8
Cans per day	770	885	710	790	1,430	1,710	1,250
Cans per hour (operating 21 hours per day)	37	42	34	38	68	81	60
Minutes between cans	1.6	1.4	1.8	1.6	0.9	0.7	1.0

[1] Recent experiments indicate that under best blanching conditions the blancher can be loaded more heavily than indicated here. Some uncertainty also exists in regard to the blanching time required to secure satisfactory results. At high blancher loading, the retention time must be longer; conversely, at light loading (e.g., on trays) time may be shorter.

[2] The blancher size and the number of trays and cars handled are based upon the total weight of trimmed material. The actual weight handled will decrease during washing, cutting and blanching, because of leaching and loss of fines. On the basis of the loadings indicated here, the size of the blancher and number of trays handled will, therefore, be somewhat less than shown in the table.

TABLE V—Approximate Utility Requirements For Dehydration Plants of Various Sizes

Utility and application	100 tons per day	50 tons per day	25 tons per day
Water		Gallons per hour	
Potatoes and sweet potatoes	10,000 to 20,000	5,000 to 10,000	2,500 to 5,000
Carrots, beets, rutabagas and onions	8,000 to 16,000	4,000 to 8,000	2,000 to 4,000
Cabbage	2,500 to 4,000	1,200 to 2,000	600 to 1,000
Electricity		Kilowatts	
Demand load	150 to 250	80 to 125	50 to 70
Fuel		B.t.u. per hour[1]	
Dehydrater			
Direct heat	15 to 20 million	7½ to 10 million	3½ to 5 million
Indirect heat	30 to 50 million	15 to 25 million	8 to 13 million
Steam heat	20 to 30 million	10 to 15 million	5 to 8 million
Blancher[2] and incidental	4 to 8 million	2 to 4 million	1 to 2 million
Boiler capacity		B.hp. (actual)[1]	
Blanching and incidental	100 to 200	50 to 100	25 to 50
Dehydrater	500 to 700	250 to 350	125 to 175

[1] The lower limits of heat requirement and boiler capacity for the dehydrater are considerably larger than needed for some vegetables under good operating conditions. On riced white potatoes, for example, the minimum heat requirement may be less than two-thirds of that indicated in the table.

[2] Low limit is based on continuous-type blancher If batch-type blancher is used, blanching steam demand will be higher.

Watch the Details In Truck Operations

Attention to "little things," formerly unimportant in a preventive maintenance system, will pay dividends to food fleet operators. A check-up on details in servicing trucks saves valuable equipment

TO KEEP their trucks rolling for the duration, food field fleet owners will find it necessary to give more and more attention to their maintenance procedure and to do many things sometimes overlooked or neglected. Many of these things will be "little things" to be done often and regularly.

Entirely aside from an elaborate preventive maintenance system, there are several little things which will help to keep the trucks rolling, such as a drop of oil here and a shot of grease there. But these must be done regularly to be really effective.

For example, a drop of oil on the fan assembly, starter, generator and the clutch throw-out bearing after every 500 to 1,000 miles of operation and a shot of grease to the propeller-shaft universals, front and rear spring bolts and shackles, kingpins and drag links will keep these moving or rubbing parts in good condition.

Also little things like checking every morning for oil leaks from the engine, gearset or rear axle will many times prevent these units from running dry and resulting in expensive repairs.

Little things like tightening tire rim or wheel mounting nuts pay big dividends. OPA refusal to grant recapping permits to truck users who do not take proper care of their tires has gone a long way toward conserving our critically short rubber supply.

A daily check of the air pressure in each tire is essential to get the greatest service from it. But loose tire rim or wheel mounting nuts permit the tires to shift out of line and result in excessive wear.

If tire service is performed by men other than drivers, which is usually the case, the driver must never be lost sight of as a most important man in

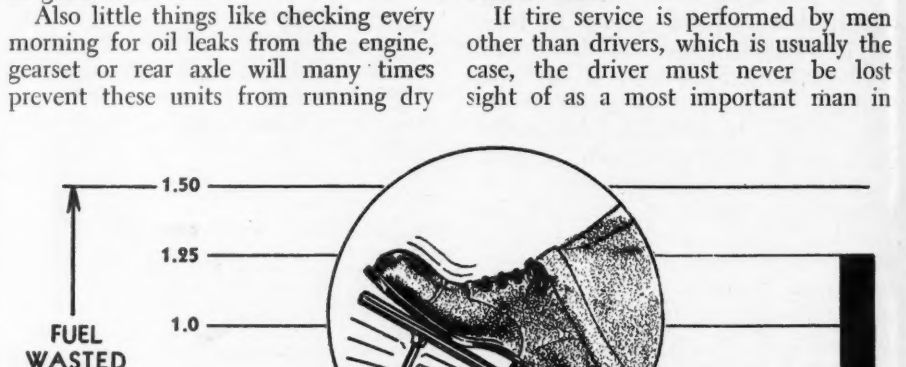


Chart prepared by International Harvester Co. truck engineers to show how patting the accelerator pedal by drivers during traffic stops wastes precious gasoline.

One of the typical White Motor Co. branch service stations equipped with the most modern shop equipment to assist fleet owners whose shop personnel has been depleted by withdrawals into the armed forces and into other defense projects. Due to the scarcity of new parts, many worn parts now have to be reconditioned.

saving tires. He can undo in a few hours driving all the good work done by the tire service men in providing properly inflated and mounted tires. The driver's service card to be mounted in the vehicle cab can be made a constant reminder for the driver to do his share.

A particularly appropriate cab card of this nature is shown in one of the accompanying illustrations.

Another little thing, the elimination of which will help to conserve truck gasoline, is the practice of drivers in patting the accelerator pedal while the vehicle is standing still at a traffic light or while parked with the engine running.

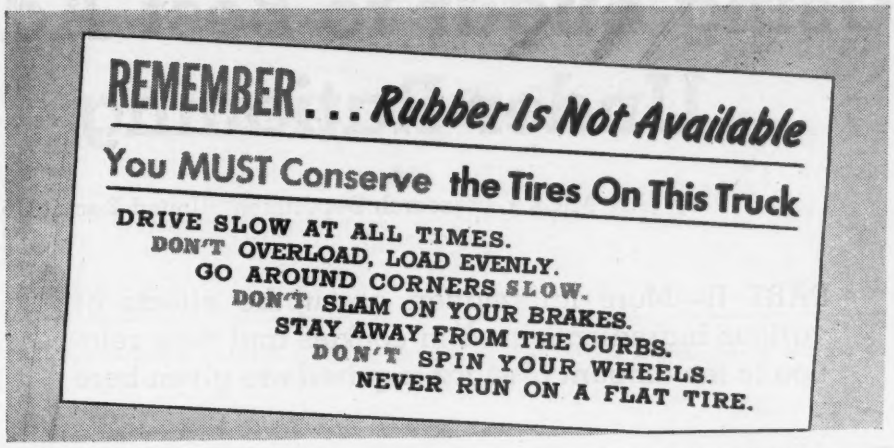
International Harvester Co. truck engineers recently conducted a test to determine just how much gasoline was wasted in a given time by this accelerator patting practice. They took a typical 1½-ton truck with a 233-cu. in. displacement engine and set the idling speed for the best economy at 325 r.p.m., at which speed the engine consumed ¼ gal. of fuel per hour.

Tests made on the basis of 150 traffic stops per day at an average of 45 seconds per stop showed a fuel consumption at idling speed during the day of 0.4675 gal. By patting the accelerator just once at each stop, an additional ½ pint of fuel was wasted per day, or 19.5 gal. in a year of 312 working days. If there were 100 trucks in the fleet, this wastage would be 1,950 gal. a year. If the driver of each truck patted the accelerator twice instead of once at each traffic stop, the wasted fuel would be doubled.

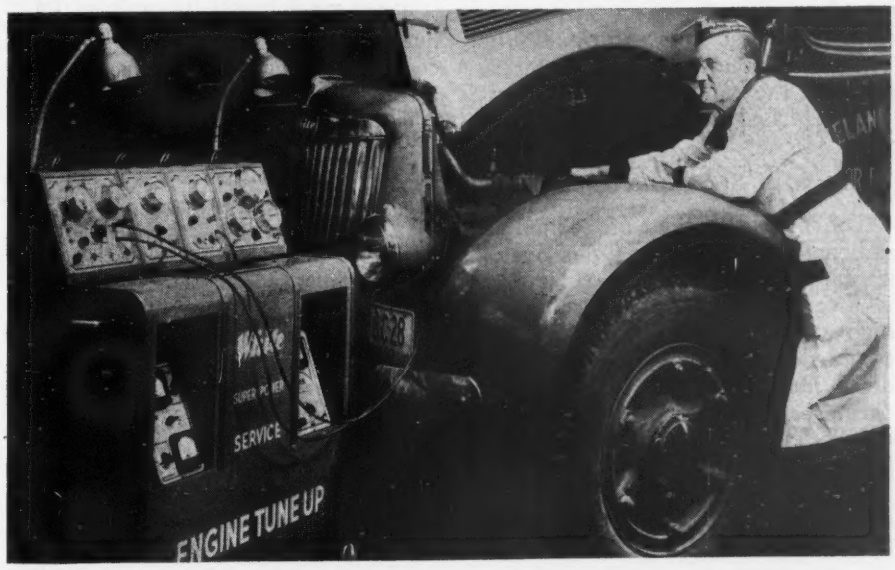
In order to assist those fleet owners whose shop personnel has been depleted by withdrawals of men into the armed forces or into other defense projects, practically all of the prominent truck manufacturers have stepped up their service station organizations throughout the country. Among these, the White Motor Co. converted a large portion of its sales force into trained service men to help fleet owners to maintain their equipment for the duration.

A typical White branch service station and some of the work it is equipped to perform as an aid to fleet owners are shown in the accompanying illustrations. The use of engine tune-up instruments and exhaust gas analyzers help to save fuel and prevent road breakdowns.

Many users unable to secure new engine crankshafts have reconditioned worn shafts by blowing on metal by the metalizing process. Also many worn and scored brake drums have been reconditioned by turning down the drums on a lathe.


REMEMBER . . . Rubber Is Not Available
You MUST Conserve the Tires On This Truck
DRIVE SLOW AT ALL TIMES.
DON'T OVERLOAD. LOAD EVENLY.
GO AROUND CORNERS SLOW.
DON'T SLAM ON YOUR BRAKES.
STAY AWAY FROM THE CURBS.
DON'T SPIN YOUR WHEELS.
NEVER RUN ON A FLAT TIRE.

Reproduction of an especially appropriate driver's cab card to remind him continually that Uncle Sam expects him to do his share to make our supply of truck tires carry over for the duration.



The use of engine tune-up instruments and exhaust gas analyzers such as shown above in a White service station helps to save fuel and prevent road breakdowns.

Worn and badly scored brake drums often can be saved for many more miles of useful service by turning them down in a lathe as shown above.

Using Sugar to Best Advantage Under Rationing

By JAN MICKA, Research Department, United Biscuit Co. of America, Chicago, Ill.

PART II—More information about the effects of various ingredients used in cookies and their relation to the amount of sugar required are given here

IN addition to those factors affecting the use of sugar which were discussed in Part I of this article (FOOD INDUSTRIES, June, 1943), attention must be paid to the effects of soda and ammonia and of corn sugar and sirup. These are discussed here and the results of the study upon which the article is based are summarized.

Effects of Soda and Ammonia

The chief function of sodium bicarbonate in cookie doughs is neutralization and leavening action. However, if "free" soda is present in sufficiently high quantities, the gluten in flour breaks down and collapses so that the dough does not rise normally in the oven. Consequently, less sugar is required for the spread. Soda does not give a true spread to the cookie, as does sugar, and should not be employed as a sugar substitute. Soda is sometimes used in excess when the flours are too strong and in chocolate cookies where a certain excess of soda is desirable for the flavor and color effect.

Table IV indicates that for the same quantity of soda (12.2 oz.) a chocolate cookie requires 22.50 percent more sugar than a plain semihard sweet cookie. By increasing the soda by 4.1 oz., the increase in sugar for the chocolate cookie is reduced to 17.50 percent. When the soda is further increased by 8.2 oz. to make 24.5 oz. per 100 lb. of flour, 5.0 percent less sugar is used in the plain cookie.

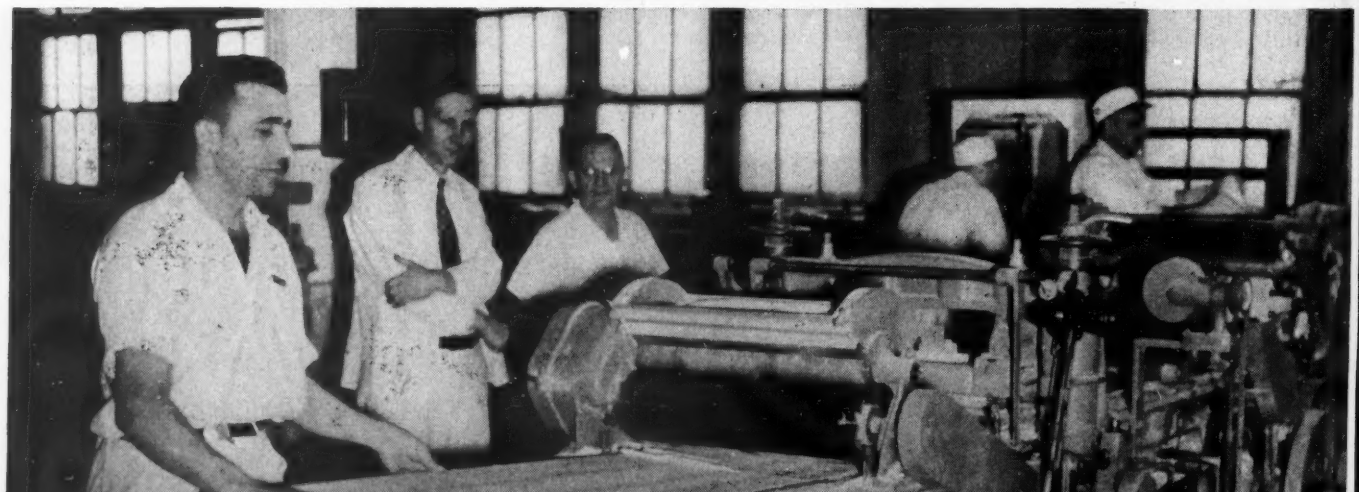
Ammonium bicarbonate decreases sugar requirements considerably, especially if used in excess, as shown for the lemon cookie, where there is a decrease of 15.53 percent with 28.6 oz. of ammonia per 100 lb. of flour (Table IV).

A considerable amount of sugar may be saved if soda and ammonia are used in excess. However, any gains thus derived are more than offset by the very detrimental effect on baking quality (easily scorched) and on the tenderness and flavor (tough and soapy). On the other hand, if the correct proportion of ingredients is used, especially in leavening, so that the raising and spreading action in the oven is balanced, some saving of sugar is accomplished.

Effect of Corn Sugar and Sirup

When sugar rationing came into effect, dextrose hydrate (corn sugar) was first thought of to replace sucrose. Some bakers have used dextrose for many years to improve color and bloom in baking. Commercial tests show that from 10 to 30 percent of the sucrose can be replaced by dextrose (Table V). But to obtain the same size cookie (spread) as with sucrose, the dextrose content must be increased 50 percent; 8.5 percent of water of crystallization in dextrose is responsible to some extent for the increase.

Dextrose can be used successfully with the softer type flour (close to 8 percent protein content) in any type of cookie dough if thorough creaming



Cracker-forming machine consists of an upright dough break (compression roll), sheeting rolls, cutter (combination printing and size-determining dieplate operating in a vertical plane) and a revolving brush to apply salt on cracker surface. Crackers are manually peeled into the oven and they retain their preformed size and shape during baking.

and mixing is employed. Doughs containing dextrose for the short-bread cookies made on the rotary machine require at least 25 lb. or more of shortening per 100 lb. of flour; otherwise, the doughs are too sticky. Dextrose should be added either during creaming or on top of the flour with powdered skim milk.

Too fast baking may prove disasterous, causing scorching of the cookies at the edges of the pans while the cookies in the center are pale and underbaked and stick to the pans. Thorough baking for a longer time and at lower temperature is necessary. This is especially true for wire-cut doughs, which caramelize very easily because of their high moisture content and if pH is higher than 8.0. This carmelization, if carried too far, results in a bitter aftertaste.

Thorough cooling is also important to prevent the cookies from sticking together when packed. In quick cooling, moisture condenses on the surface of the cookies. It dissolves the sucrose, dextrose or any other sugar on the surface and causes soft spots wherever the cookies touch each other. Then upon drying, the cookies stick together. This sticking is very noticeable in wire-cut pieces, especially if they are underbaked. It is characteristic of any type of sugar but very pronounced when dextrose is used.

Because of its binding effect on the gluten in flour, corn sirup retards the raising of the dough in the oven. This effect means that less sugar is necessary for spread. Table V indicates that a considerable saving of sugar can be accomplished, as much as 37.88 percent in the wire-cut pieces. Because of the behavior of the doughs containing corn sirup during baking, as well as during the cooling of the finished product, similar precautions must be taken as in the case of dextrose.

When all is said, practically every ingredient used in the cookie formulas affects the sugar requirements of the doughs one way or another. Results obtained with different types of shortenings and sugars are given in Table V. Although hydrogenated vegetable shortening requires more sugar for spread, it gives better results than oleo oil in the creaming and in the finished product. Powdered sugar gives the cookies a better appearance than does granulated sugar, but allowances must be made for the 3 percent of cornstarch which it contains.

Conservation of Sugar

In cake baking, the introduction of high-ratio cakes with 140 lb. of sugar per 100 lb. of flour was a radical change in the cake formulas. There was no such change in cookie baking. But fast baking to get increased production was probably responsible for the slight increase in sugar used. In comparison, there is little difference between the quantity of sugar in present-day cookie formulas and those of many years ago. And such increase as has been made can be saved by slowing down the baking rate.

Comparison of the ratio of flour and sugar in the lean and rich formulas of wire-cut pieces (as shown in Table I, Part I, FOOD INDUSTRIES, June, 1943, page 70) shows the lean formulas to require more sugar than the rich. This seeming paradox is easy to understand because the lean doughs have more flour for the sugar to spread, whereas the rich formulas contain milk, eggs and a larger quantity of shortening with less flour and consequently less sugar. This effect holds for most of the cookie formulas, and for this reason sugar rationing should result in the increased production of higher grade cookies, provided the other ingredients which add to the richness are available. Thorough baking (a longer time at a lower temperature) will be necessary for the cookie baker to derive the full benefit of the available sugar, as well as of other ingredients, especially shortening.

In summing up of the results of our study, we wish to emphasize these points as being of special importance.

1. Use of sucrose is not desirable in soda cracker doughs.
2. Sucrose is the only ingredient in cookies that gives a controllable spread, and for that reason is used to adjust formulas.
3. Sucrose increases the mixing tolerance of the doughs, and its use prevents the dough from becoming tough.
4. "Hot" doughs require less sucrose than do "cool" doughs.
5. Cookies made on the wire-cut machine require doughs with the most sugar. They also have the best spread.
6. Use of low-protein, soft winter wheat flours permits a reduced quantity of sucrose in doughs. For that reason Michigan and Pacific Coast flours possessing those properties are especially suitable for wire-cut cookies.
7. Use of coconut and cocoa increase the sucrose requirements of cookie doughs, whereas the use of soda (sodium bicarbonate), ammonia (ammonium bicarbonate) and glucose decreases the sucrose requirements.
8. Dextrose hydrate can replace sucrose by 10 to 30 percent, but the "total sugar" content is increased.
9. Aside from its sweetening properties and "spreading" effect during baking, sucrose plays a major role in the mixing and machining of cookie doughs as well as in the appearance and eating quality of the finished cookie.

TABLE IV—Effect of Soda (Sodium Bicarbonate) and Ammonia (Ammonium Bicarbonate) on Sugar Requirements of Cookie Doughs.

Type of machine	Kind of cookie	Sucrose (lb.[1])	Sucrose Decrease (percent)	Sucrose Increase (percent)	Soda (oz.[1])	Ammonia (oz.[1])
Wire-cut	Vanilla	75.0	Control	.....	8.2	
Wire-cut	Vanilla	69.4	7.48	.....	20.4	
Cutting	Semihard sweet	40.8	Control	.....	12.2	
Cutting	Semihard sweet chocolate..	50.0	.....	22.50	12.2	
Cutting	Semihard sweet chocolate..	48.0	.....	17.50	16.3	
Cutting	Semihard sweet chocolate..	38.8	5.00	.....	24.5	
Wire-cut	Lemon	52.5	Control	.....		16.3
Wire-cut	Lemon	44.4	15.53	.....		28.6
Cutting	Semihard sweet	32.7	Control	.....		18.5
Cutting	Semihard sweet	28.6	12.50	.....		28.6
Rotary	Short-bread	41.8	Control	.....		0.
Rotary	Short-bread	37.3	10.98	.....		6.1

[1] Per 100 lb. of flour.

TABLE V—Effect of Dextrose Hydrate, Glucose, Shortening and Granulation of Sucrose on Sugar Requirements of Cookie Doughs.

Type of machine	Kind of cookie	Sucrose[1]	Dextrose hydrate[1]	Total	Sucrose replaced (percent)	Glucose[1]
Wire-cut	Vanilla	71.4	None	71.4	None	
Wire-cut	Vanilla	64.3	11.7	76.0	10.0	
Wire-cut	Vanilla	57.2	21.3	78.5	20.0	
Wire-cut	Vanilla	50.0	32.1	82.1	30.0	
Cutting	Semihard sweet	43.4	None	43.4	None	
Cutting	Semihard sweet	34.7	13.0	47.7	20.0	
Rotary	Short-bread	35.7	None	35.7	None	
Rotary	Short-bread	28.6	10.7	39.3	20.0	
Wire-cut	Vanilla	67.3			None	
Wire-cut	Vanilla	41.8			37.88	30.6
Cutting	Semihard sweet	40.8			None	
Cutting	Semihard sweet	27.0			33.75	18.4
Rotary	Short-bread	33.7			None	
Rotary	Short-bread	26.0			22.73	9.2
Wire-cut	Vanilla[2]	71.4			None	
Wire-cut	Vanilla[3]	66.8			6.43	
Wire-cut	Vanilla	72.4[4]			None	
Wire-cut	Vanilla	68.8[5]			4.93	

[1] Pounds per 100 lb. of flour. [2] 25.5 Hydrogenated vegetable shortening.[1] [3] 25.5 Oleo oil.[1] [4] Powered sucrose. [5] Granulated sucrose.

Directory of Egg Drying Plants

DIRECTORY OF UNITED STATES EGG DRIERS

Plants in operation and in course of installation as of June 1, 1943

NAME	LOCATION	SYSTEM
Advance Foods Corp.	Centerville, Ind	Spray—C. E. Rogers Co.
Anamosa Poultry & Egg Co.	Anamosa, Iowa	Spray—Mojonnier Bros., Inc.
Armour & Co.	Cicero, Ill.	Spray—Western Precipitation Co.
	Dennison, Iowa	Spray—C. E. Rogers Co.
	Louisville, Ky	Spray—C. E. Barnhill
	Mankato, Minn.	Spray—C. E. Barnhill
	Sedalia, Mo.	Spray—C. E. Rogers Co.
	Springfield, Mo.	2 Spray—Douthitt Corp. Own unit
Borden Co.	Arcade, N. Y.	Spray—Own unit
	Columbus, Wis.	Spray—Krause
Bowman Dairy Co.	Harvard, Ill.	Spray—C. E. Rogers Co.
	Brooklyn, Wis.	Spray—C. E. Rogers Co.
Blue Diamond Egg Co.	Omaha, Neb.	Spray—Goodhue
Bradley Produce Co.	Harrison, Ark.	Spray—C. E. Barnhill
Christian & Co.	Pittsburgh, Pa.	Spray—C. E. Barnhill
Clary & Lay	Clovis, N. M.	Spray—C. E. Barnhill
Coble Dairy Co.	Wilkesboro, N. C.	Spray—C. E. Rogers Co.
Commercial Creamery Co.	Spokane, Wash.	Spray—Goodhue
Conestoga Cream & Cheese Co. (Farmers Equity Creamery Co.)	Lima, Ohio	Spray—Douthitt Corp.
Cudahy Packing Co.	New Ulm, Minn.	Spray—C. E. Rogers Co.
	Washington Court House, Ohio	Spray—Own unit
	Cuero, Tex.	Spray—Own unit
Denison Poultry & Egg Co.	Birmingham, Ala.	Spray—C. E. Barnhill
	Denison, Tex.	3 Spray—C. E. Barnhill
Domestic Egg Products Co.	Chickasha, Okla.	Spray—Douthitt Corp.
	McKenzie, Tenn.	Spray—Douthitt Corp.
DeSota Creamery & Produce Co.	Minneapolis, Minn.	Spray—Goodhue
Doughnut Corp. of America	Frankfort, N. Y.	Spray—Douthitt Corp.
Domestic Egg Products Co.	New Berlin, N. Y.	Spray—Douthitt Corp.
*Emulsol Corp.	Chicago, Ill.	Pan—Own unit
Fairmont Creamery Co.	Moorhead, Minn.	Spray—Douthitt Corp.
	Crete, Neb.	Spray—Douthitt Corp.
Fort Dodge Creamery Co.	Fort Dodge, Iowa	Spray—Mojonnier Bros., Inc.
Fort Worth Poultry & Egg Co. (Armour & Co.)	Fort Worth, Tex. 2 plants	Spray—Douthitt Corp. Spray—C. E. Rogers Co. Spray—Own unit
	Lampasas, Tex.	Spray—C. E. Rogers Co.
Gartenburg, H., & Co., Inc.	Chicago, Ill.	Spray—Own unit
Gross Egg Co.	Chicago, Ill.	Spray—Donaldson
Harp, O. G., Poultry & Egg Co.	Shawnee, Okla.	Spray—C. E. Barnhill
Henderson Produce Co.	Monroe City, Mo.	Spray—Douthitt Corp.
Henningsen Bros., Inc.	Denison, Tex.	Spray—Kraft Co.
	Fort Worth, Tex.	Spray—Douthitt Corp.
	Lamesa, Tex.	Spray—Douthitt Corp.
Henry, L. B., Egg Drying Co.	Dallas, Tex.	Spray
Herndon Produce Co.	Dallas, Tex.	Spray—C. E. Barnhill
Hiawatha Dairy Products (Priebe & Sons)	Hiawatha, Kan.	Spray—Douthitt Corp.
Iowa Egg Products Co (Wisconsin Commission Co.)	Platteville, Wis.	Spray—Douthitt Corp.
Iowa Food Products Co.	Guttenburg, Iowa	Spray—C. E. Barnhill
Iowa Pacific Butter & Egg Co.	Ottumwa, Iowa	Spray—Barker Poultry Equip. Co.
Jeck & Co.	Spirit Lake, Iowa	Spray—Barker Poultry Equip. Co.
Jenson, T., & Sons	Chanute, Kan.	Spray—Donaldson
Jerpe Commission Co.	Omaha, Neb.	Spray—Cardwell-Westinghouse Co.
Kress Products Corp.	Chicago, Ill.	Spray—Mojonnier Bros., Inc.
Land O' Lakes Creameries	Albert Lea, Minn.	Spray—Barker Poultry Equip. Co.
	Ripon, Wis.	Spray—Douthitt Corp.
Liggett, Harry M.	Topeka, Kan.	Spray—C. E. Barnhill
Louisiana Egg Products Co. (F. M. Stamper Co.)	Ruston, La.	Spray—Donaldson
Lowe, Joe, Corp.	San Antonio, Tex.	Spray—Donaldson
**Marquette Food Products Co.	Chicago, Ill.	2 Spray—Douthitt Corp.
Marshall Dry Egg Co.	Marshall, Minn.	2 Spray—Douthitt Corp. C. E. Rogers Co.
Marshall-Kirby & Co.	Terre Haute, Ind.	Spray—Own unit
	Jersey City, N. J.	Spray—Own unit
Marshfield Dairy Products	Marshfield, Wis.	Spray—Douthitt Corp.
Mid-State Frozen Egg Corp.	Indianapolis, Ind.	Spray—Mojonnier Bros. Inc.
Midwest Egg Co.	Atlantic, Iowa	Spray—Donaldson
Mitchell Produce Co.	Mitchell, S. D.	Spray—Barker Poultry Equip. Co.
Monark Food Products Co.	Hutchingson, Kan.	2 Spray—C. E. Barnhill Donaldson
Moss, David L., & Co.	Chicago, Ill.	Spray—Own unit
National Egg Driers, Inc.	Osage, Iowa	Spray—Douthitt Corp.
	Grand Forks, N. D.	Spray—C. E. Barnhill
	Melrose, Minn.	Spray—Douthitt Corp.
(Egg Driers, Inc.)	Cedarburg, Wis.	Spray—Own unit
(Ft. Scott Dried Egg Co.)	Ft. Scott, Kan.	Spray—C. E. Barnhill
(LaFayette Egg Driers, Inc.)	LaFayette, La.	Spray—C. E. Barnhill
(Michigan Egg Dryers, Inc.)	Morenci, Mich.	Spray—C. E. Barnhill
(Atwood Food Products Co.)	Covington, Ky.	Spray—Douthitt Corp.
(Milk Products, Inc.)	Eau Claire, Wis.	Spray—Douthitt Corp.
(Pocahontas Egg Corp.)	Pocahontas, Ark.	Spray—C. E. Barnhill
(Richard C. Solow & Co.)	Woodward, Okla.	Spray—Douthitt Corp.
Northern Indiana Producers (Short Produce Co.)	Riverdale, Ill.	Spray—Mojonnier Bros., Inc.
Omaha Cold Storage Co. (Bellevue Creamery & Produce Co.)	Omaha, Neb.	Spray—Goodhue
Parkway Dried Egg (Rothenberg & Schreider)	Chicago, Ill.	Spray—Douthitt Corp.
Parrott, W. B., Co. (Priebe & Sons)	Manning, Iowa	Spray—Douthitt Corp.
Pietrus, A. J., & Sons	Sleepy Eye, Minn.	Spray—Douthitt Corp.
Portage Wholesale Co.	Portage, Wis.	Spray—Mojonnier Bros., Inc.
Powdered Foods	West New York, N. J.	Spray—Own units
Priebe & Sons, Inc. (Bennett Poultry & Egg Co.)	Ottawa, Kan.	Spray—Mojonnier Bros., Inc.
(Des Moines Coop. Dairy)	Des Moines, Iowa	Spray—C. E. Rogers
**Producers Produce Co.	Springfield, Mo.	Spray—Mojonnier Bros., Inc.
Rancho Egg Farms	Los Angles, Calif.	Spray
Robert Arnold Co.	North Bergen, N. J.	Spray—Own unit
Rubenstein, S. J. (Ft. Worth Poultry & Egg Co.)	Dallas, Tex.	Spray—C. E. Barnhill
Seymour Packing Co.	Topeka, Kan.	Spray—Mojonnier Bros., Inc.
Sheboygan Produce Co. (Veri-Fine Dairy Products)	Sheboygan, Wis.	Spray—Own unit
Silvers & Rich	Hastings, Mich.	Spray—C. E. Rogers Co.
Sioux Valley Produce	Canton, S. D.	Spray—Barker Poultry Equip. Co.
Stamper, F. M., Co.	Moberly, Mo.	Spray—Douthitt Corp.
(Saline Milk Producers Assn.)	Marshall, Mo.	Spray—Douthitt Corp.
(Central Farms Products Co.)	Trenton, Mo.	Spray—Douthitt Corp.
Steuelpnagel Produce & Storage Co.	Yankton, S. D.	Spray—Barker Poultry Equip. Co.
Super-Spray Products Co.	Philadelphia, Pa.	Spray
Swift & Co.	Des Moines, Iowa	Spray—Douthitt Corp.
	Keokuk, Iowa	Spray—Douthitt Corp.
	Alma, Mich.	Spray—Douthitt Corp.
	Sedalia, Mo	Spray—Douthitt Corp.
	Muskogee, Okla.	Spray—Douthitt Corp.
	Chambersburg, Pa.	Spray—Douthitt Corp.
	Nashville, Tenn.	Spray—Douthitt Corp.
	*Ft. Worth, Tex	Tunnel—Own unit
	Enid, Okla.	Spray—Douthitt Corp.
	Wichita Falls, Okla.	Spray—Douthitt Corp.
Teaford & Danches	Highland, Ill.	Spray—C. E. Rogers Co.
(Red 73 Creamery Co.)	Union City, Ind.	Spray—C. E. Rogers Co.
(Pevely Dairy)	St. Louis, Mo.	Spray—C. E. Rogers Co.
Texas Dehydration Products Co. (Market Produce Co.)	Ft. Worth, Tex.	Spray—C. E. Barnhill
Thomas Dried Egg Co. (Kennedy Mayonnaise Products Co.)	Minneapolis, Minn.	Spray—C. E. Barnhill
Tranin Egg Products Co. (U. S. Cold Storage Co.)	Kansas City, Mo.	Spray—Own unit
Tri-State Produce Co.	Sioux City, Iowa	Spray—C. E. Barnhill
Twin Rivers Co., Inc.	Grand Island, Neb.	Spray—Donaldson
Wadley Co.	Terre Haute, Ind.	Spray—C. E. Barnhill
Washington Cooperative Poultry & Egg Co.	Lynden, Wash.	Spray—Douthitt Corp.
White City Provision Co. (U. S. Cold Storage Co.)	Chicago, Ill.	Spray—Tranin
Wilson & Co.	Atchison, Kan.	Spray—Cardwell-Westinghouse Co.
	Abilene, Tex.	Spray—C. E. Barnhill
Wisconsin Dried Egg Corp.	Oconto, Wis.	Spray—C. E. Rogers Co.

*Whites only. **In course of installation.

DIRECTORY OF CANADIAN EGG DRIERS

Plants in operation as of June 1, 1943

NAME	PLANT LOCATION	SYSTEM
Alberta Poultry & Marketing Board	Edmonton, Alb.	Spray—Esdon
Borden Co., Ltd.	Winnepeg, Man.	Spray—Own unit
	Belmont, Ont.	Spray—Own unit
Burns & Co.	Calgary, Alb.	Spray—Tranin
Canada Egg Products, Ltd.	Saskatoon, Sask.	Spray—Esdon
Canadian Doughnut Co., Ltd.	Trenton, Ont.	Spray—Douthitt Corp.
Lowe, Joe, Corp.	Winnepeg, Man.	Spray—Tranin
Ottawa Dairy (Borden Co., Ltd.)	Ottawa, Ont.	Spray—Douthitt Corp.
Swift Canadian Co., Ltd.	Toronto, Ont.	Spray—Douthitt Corp.

Sanitation in Food Plants A Must in Wartime

IT is even more important to maintain perfect food plant sanitation in wartime than in peacetime, for even though foods may not actually spoil because of bacterial action, the uncontrolled bacteria will result in loss of quality and possible government rejection. In egg dehydrating plants, for example, lack of strict attention to sanitation in handling and in processing the product at any stage may cause the product to be rated Grade B instead of Grade A, meaning a reduction in selling price and a severe cut in the processor's profit. Or, if conditions are too bad, the dehydrated eggs will be unfit for table use and the processor is likely to lose his shirt. That is but one example. The principle applies to all food processing.

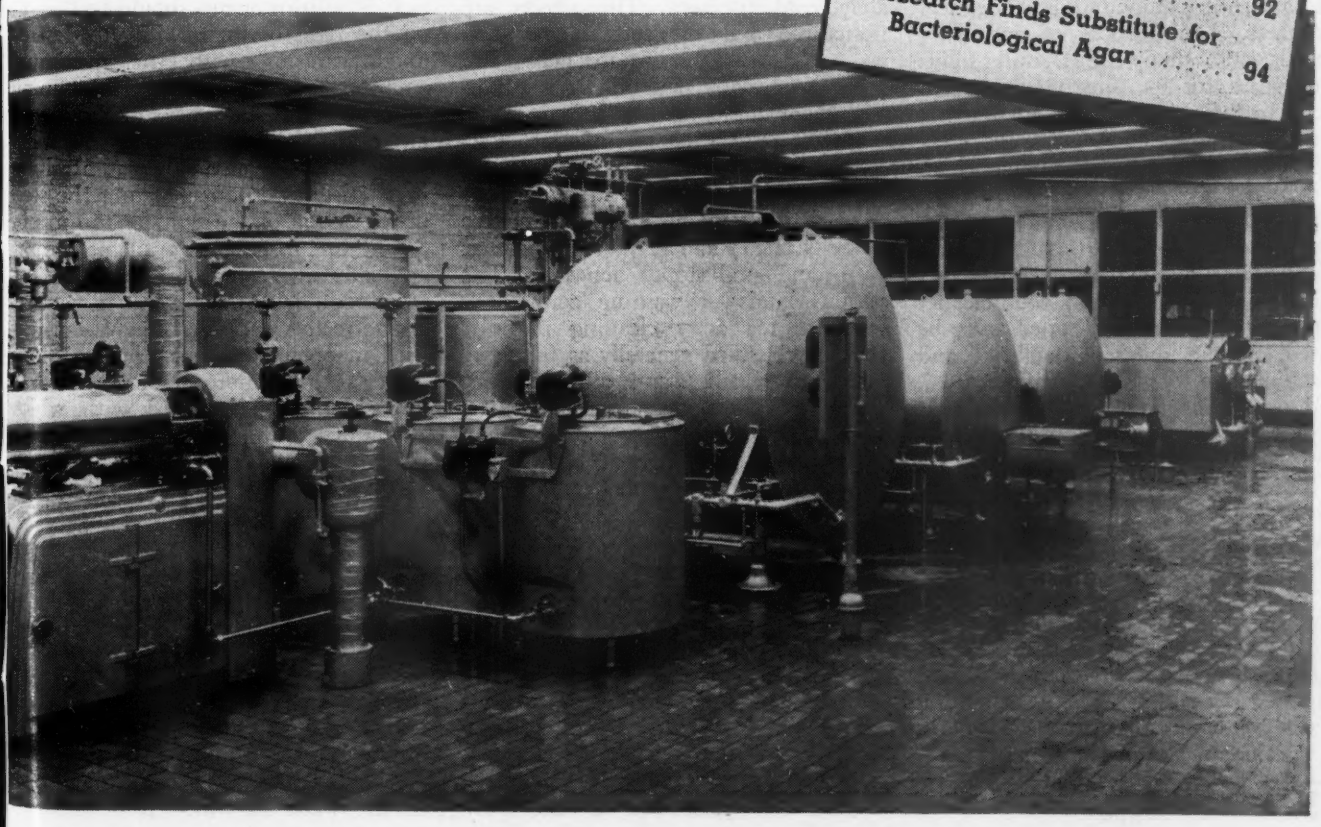
But with the huge labor turnover in food processing plants, management has a particularly difficult job in teaching employees how to keep the place and its equipment clean.

To assist not only management in this important and difficult wartime job, but to provide food technologists and engineers with information about new methods and technics, FOOD INDUSTRIES is publishing in the following pages a series of articles on sanitation and cleanliness. Among those articles you will find discussions on the effectiveness of new methods of controlling insect infestation of the product, killing bacteria in the plant and the laboratory, and disposing of food plant waste. You will also find practical "what they will do" information about detergents, as well as a discussion of the improved results obtained in washing fruits and vegetables in a solution containing a wetting agent. Then there is an article telling what constitutes satisfactory sanitation in an egg dehydrating plant and what dividends it pays the dehydrator, together with a discussion of a substitute which has been discovered for bacteriological agar used in quality control work in the food industries.

Some more of this type of material will be published in the August issue of FOOD INDUSTRIES.

CONTENTS

Manual of Dairy Detergents and Cleaning Practices 78
Wetting Agents Speed Washing 81
Mechanical Treatment Destroys Insects in Foods 82
How To Meet the Demand for Better Waste Disposal 84
New Vacuum Flotation Process Aids Liquid Waste Disposal . . 87
Sanitation Pays Dividends To the Egg Dehydrator 90
Tests Show Bactericidal Power of Ultraviolet 92
Research Finds Substitute for Bacteriological Agar 94



Satisfactory food plant sanitation begins in the design of the plant and equipment and the layout of the equipment in the plant. Here is an ice cream plant that illustrates what is meant. The building, including floors, walls, ceilings and drains, is designed to facilitate keeping the plant clean. So also is the equipment, as it must be in a dairy plant. And the layout is such that short runs of piping are used, making it easier and less costly to keep the pipes clean.

Manual of Dairy Detergents And Cleaning Practices*

By M. E. PARKER, Manager of Production, Beatrice Creamery Co., Chicago, Ill.

PART I—The attributes and shortcomings of the various types of dairy washing compounds are cited and directions for cleaning cream cans, separators and farm utensils are given in the three installments of this very practical discussion

AUTHOR'S NOTE: *Listed herein are the trade names of several dairy cleaning compounds. This list is not complete but it is illustrative. The manufacturers of these compounds have been freely consulted and to their technical staffs is due considerable credit for their cooperation and collaboration in preparing this manual. We shall append to Part II an index of the trade names mentioned so that their manufacturers can be readily ascertained.*

EFFECTIVE CLEANING of cream transport cans, separator parts and farm utensils is not attained by the mere use of washing compounds and chemical sterilizers. The purpose of any dairy cleaner is to prepare dirt, milk solids and grease for its subsequent detachment by brushing and its final elimination by rinsing.

As with many things about which dairymen have little exact knowledge, many dairy washing compounds sometimes are invested with magical powers. Their function is to remove dirt and grease. This is all any good cleaner can do. Differences in price may be based on the different qualities and combinations of the chemicals used, and other materials added to combat hardness in water or to give the cleaner some special character.

Selecting the right cleaner would be a simple matter if soft water were available everywhere. The degree of hardness in water varies in different parts of the country, even from town to town in some sections. Table I lists the average water hardness in different sections of the United States and Canada, and is a partial guide to the condition of the water in your area. If you wish a specific report on the degree of hardness of your local water supply, you can obtain this by calling the Department of Sanitation in your community. This information may be given in terms of degrees or grains, or as parts per million. One degree or grain of hardness based on a gallon is calculated at about 17 parts per million.

Water containing from one to 60 parts per million of hardness is relatively soft and may not need softening. Water of 61 to 120 parts per million is considered slightly hard and is usually softened in commercial laundries and other plants.

Water of 121 to 180 parts per million is considered to be from moderately hard to hard. The effects are noticeable and the softening of this water is desirable. Any water above 180 parts per million of hardness is admittedly hard and should be softened.

Dairy washing compounds are effective only when they will either emulsify butterfat or penetrate grease films (and float them off the metal surface to be cleaned) and peptize, or dissolve, curd and milkstone deposits. The various kinds of washing compounds available for dairy cleaning purposes may be classified generally as follows:

1. The alkalies and alkaline salts, such as caustic soda, sodium metasilicate, trisodium phosphate, sodium carbonate and bicarbonate of soda, or various mixtures of such chemicals.

2. The acid materials used for waterstone and milkstone removal, such as inhibited muriatic acid (hydrochloric acid), phosphoric acid, tartaric acid, as well as the new acid cleaners for general cleaning developed within recent years.

3. Neutral materials such as wetting agents which rely on neither acidic or alkaline properties in their use.

4. The water-conditioning chemicals commonly referred to as the polyphosphates, which in general have no marked detergent characteristics but do have special properties in the compounding or application of effective cleaner mixtures, nevertheless.

5. Miscellaneous materials such as abrasives, metal cloth, and so forth, which are used as mechanical aids with or without cleaning compounds.

There are also various compounds which attempt to combine cleaning action and disinfecting properties, but such products are expensive and uneconomical to use as cleaners inasmuch as it is not possible to sterilize an unclean surface. Therefore, such products are either cleaners for a soiled surface or sterilizing agents for a clean surface, but never a cleaner and sterilizing agent on a contaminated surface. When chlorine germicides are used, such contamination quickly liberates the small amount of chlorine present and dissipates its disinfecting properties.

Cleaners should be bought on the merit of their ability to clean a surface. Sterilizing agents should be bought on the basis of their ability to destroy microorganisms, with the maximum amount of chlorine obtainable at minimum cost. The directions of the manufacturer should be followed to render such products noncorrosive as nearly as it is possible without affecting the sterilizing action of the product too much.

Chlorine in its most available form is an oxidizing agent; in fact, its ability to corrode dairy metals and to sterilize is due to this characteristic. When it is used in organic forms such as Chloramine T, it is more stable than most hypochlorites. The speed with which the available chlorine is liberated from either Chloramine T products or hypochlorites depends on the acidity (pH) of the solution in which it is used. This is easily demonstrated by the thiosulphate test for available chlorine. In an alkaline reaction all of the so-called available chlorine is not readily available; yet it is released rapidly when the solution is made acid. In fact, the sterilizing action of chlorine germicides is determined by the reaction (acid or alkaline) of the solution in which it is used, the amount of organic matter in the water in which it is dissolved

* Prepared for Research Committee of American Butter Institute.

and the temperature of the solution, as well as the length of time the solution is allowed to act in contact with the surface to be sterilized.

Explanation of Alkalies Used In Dairy Washing Compounds

There are many hundreds of alkaline cleaning materials on the market, some of them supposedly made from secret formulas, and the bewildered buyer is expected to make selections from them for various cleaning problems.

Practically all of the alkaline products used in the dairy industry are made from compounds or combinations of *straight chemicals*. In general, there are five major alkalies which are used in compounding alkaline cleaning compounds (see Table II) although in some instances the polyphosphates are also utilized. These latter chemicals we will discuss separately.

TABLE II—Major Alkalies Used in Cleaners.

Common Name	Chemical Name	Chemical Formula
Caustic soda..	Sodium hydroxide	NaOH
Metasilicate..	Sodium metasilicate	$Na_2Sio_3.5H_2O$
T.S.P.....	Trisodium phosphate	$Na_3PO_4.12H_2O$
Soda ash	Sodium carbonate	Na_2CO_3
Baking soda..	Sodium bicarbonate	$NaHCO_3$

Each of these five major alkalies has a definite chemical characteristic and if properly used will do a specific job.

The pH values and sodium oxide contents of these products in order of their active alkalinity in a 1 percent solution are given in Table III. In other

TABLE III—pH and Sodium Oxide Values.

Common Name	pH Value in 1% solution (at 75 deg. F)	Total Na_2O (percent)	Active* Na_2O (percent)
1. Caustic soda...	13.1	76.	76.
2. Metasilicate. ..	12.4	29.	28.5
3. Soda ash.....	11.2	58.	24.
4. T.S.P.....	11.9	24.	8.
5. Baking soda...	8.4	37.	0

*Refers to Na_2O value above phenolphthalein endpoint.

TABLE I—Average Water Hardness in United States and Canada.*

Average water hardness, as listed below, is representative of general conditions in the states or provinces but does not show accurately the specific hardness of water in different areas since there is much variation even from town to town. The listing does, however, serve as a general guide.

Surface waters are supplies taken from lakes, rivers, creeks and ponds. Ground or subsurface waters are from springs and wells.

Unless specifically indicated as ground or surface water, the general water supply is the average of all water throughout the state or province.

	Soft 0–60 parts per million	Moderate soft 61–120 parts per million	Moderate hard 121–180 parts per million	Hard 181+ parts per million
UNITED STATES				
Alabama	x	...	...	...
Arizona	...	...	...	x
Arkansas				
Surface water	...	...	x	...
Ground water	x	...	...	...
California	...	...	x	...
Colorado	...	...	x	...
Connecticut	x	...	...	...
Delaware				
Surface water	x	...	...	...
Ground water	...	x	...	...
District of Columbia	...	x	...	...
Florida				
Surface water	...	x	...	...
Ground water	...	...	x	...
Georgia				
Surface water	x	...	...	...
Ground water	...	x	...	...
Idaho	...	x	...	...
Illinois				
Supplied by Lake Mich.	...	...	x	...
Not supplied by Lake Mich.				
Surface water	...	...	x	...
Ground water	...	...	...	x
Indiana	...	...	...	x
Iowa				
Surface water	...	...	x	...
Ground water	...	...	...	x
Kansas	...	...	...	x
Kentucky	...	x	...	...
Louisiana				
Surface water	...	x	...	...
Ground water	x	...	...	...
Maine	x	...	...	...
Maryland	x	...	...	...
Massachusetts	x	...	...	...
Michigan				
Surface water	...	x	...	...
Ground water	...	...	...	x
Minnesota				
Surface water	...	...	x	...
Ground water	...	...	...	x
Mississippi	x	...	...	...
Missouri				
Surface water	...	...	x	...
Ground water	...	...	...	x
Montana				
Surface water	...	x	...	...
Ground water	...	...	...	x
Nebraska				
Surface water	...	...	...	x
Ground water	...	...	x	...
Nevada				
Surface water	...	x	...	...
Ground water	...	...	...	x
New Hampshire	x	...	...	...
New Jersey				
Surface water	x	...	...	...
Ground water	...	...	x	...
New Mexico				
Surface water	...	x	...	...
Ground water	...	...	...	x
New York				
New York City				
Surface water	x	...	...	...
Ground water	...	x	...	...
Remainder of state				
Surface water	...	x	...	...
Ground water	...	...	x	...
North Carolina				
Surface water	x	...	...	...
Ground water	...	x	...	...
North Dakota				
Surface water	...	...	x	...
Ground water	...	...	...	x
Ohio				
Surface water	...	...	x	...
Ground water	...	...	...	x
Oklahoma				
Surface water	...	...	x	...
Ground water	...	...	...	x
Oregon	x	...	...	...
Pennsylvania				
Surface water	...	x	...	...
Ground water	...	...	...	x
Rhode Island	x	...	...	...
South Carolina	x	...	...	...
South Dakota	...	...	...	x
Tennessee				
Surface water	...	x	...	...
Ground water	x	...	...	...
Texas	...	...	x	...
Utah	...	...	x	...
Vermont	...	x	...	...
Virginia				
Surface water	x	...	...	...
Ground water	...	...	x	...
Washington				
Surface water	x	...	...	...
Ground water	...	x	...	...
West Virginia				
Surface water	...	x	...	...
Ground water	...	...	x	...
Wisconsin				
Surface water	...	...	x	...
Ground water	...	...	...	x
Wyoming				
Surface water	...	x	...	...
Ground water	...	...	...	x
CANADA				
Alberta	...	...	x	...
British Columbia				
Surface water	x	...	...	...
Ground water	...	x	...	...
Manitoba				
Surface water	...	...	x	...
Ground water	...	...	...	x
New Brunswick	x	...	...	...
Nova Scotia	x	...	...	...
Ontario				
Surface water	...	...	x	...
Ground water	...	...	...	x
Prince Edward Island	...	x	...	...
Quebec	...	x	...	...
Saskatchewan	...	...	...	x

*Table from "Better Buymanship, Use and Care," by Household Finance Corp., Bulletin No. 16, November, 1942.

words, the higher the sodium oxide (Na_2O) and pH values above the pheolphthalein end-point (which is approximately pH 8.4), the greater the active alkalinity. On the other hand, total alkalinity is expressed as sodium oxide content. For example, in Table III you will note that soda ash has a sodium oxide content of 58 (which figure is used in the trade in designating commercial soda ash, commonly referred to as "58 percent soda ash.")

Yet soda ash is not as active in alkalinity as either caustic soda, metasilicate or T.S.P., as the pH and active Na_2O values indicate.

Caustic Soda. Caustic soda in solution form is a powerful solvent and is used to peptize or suspend dirt and saponify oil and fats. Caustic soda in the dairy industry is the basis of the germicidal power in the solution due to alkalinity alone. Accordingly, it is a strong cleaning agent and effective germicide when used for mechanical bottle washing.

Practically 100 percent of the alkalinity of caustic soda is active, but solutions of straight caustic soda are generally considered difficult to rinse. Caustic soda precipitates lime and is so vigorous chemically that at very high temperatures it can destroy, to some extent, any glass surfaces. Because of its intense corrosive action, it is not to be recommended for cleaning cream cans, separator parts and farm utensils.

EXAMPLE: *Commercial Flake Caustic.*

Metasilicate. Sodium metasilicate is an effective cleaner for many purposes, and in addition possesses definite anticorrosive properties. As in the case of trisodium phosphate, sodium metasilicates should be used in water temperatures not to exceed 145 deg. F, particularly in hard waters. Sodium metasilicate has much to commend its use, including wetting power, high emulsifying power and high deflocculating power (the disintegration of dirt).

The action of metasilicate is easy on tin, aluminum and all materials, but it is not a complete cleaner within itself, although it will generally be found adequate in cleaning most dairy utensils. While it is harmless to dairy metals in low concentration, it may affect the operator's hands on account of its alkalinity. Like trisodium phosphate, metasilicate is an important addition to any good cleaning compond.

EXAMPLES: *Metso Granular, Metso Crystals, Metso Anhydrous, Magnus Supersils.*

T.S.P. (Trisodium Phosphate). Trisodium phosphate has been the outstanding material for softening water of any of the basic alkalies until the advent of the polyphosphates, particularly when water with high temporary hardness is used for washing. Trisodium phosphate is second to sodium metasilicate in emulsifying power. In using trisodium phosphate alone for general cleaning, care must be taken not to permit the solution to be used hot because of its spangling effect on aluminum and tin. Its use must also be followed by adequate rinsing with plenty of hot water. The addition of a reasonable amount of trisodium phosphate is often desirable in manufacturing a good general cleaning compound.

EXAMPLE: *Commercial T.S.P.*

Soda Ash. Soda ash alone is only a fair cleaner and is not always as effective as the more active chemicals mentioned above. Its germicidal strength is limited and its water-softening ability is often a detriment in dairy detergency; yet it is an important addition to many cleaning compounds. It assists in cleaning and acts as a buffering agent, providing reserve alkalinity for the stronger compounds.

EXAMPLES: *Commercial 58 percent soda ash, Solvay "Fluf."*

Sodium Bicarbonate. As previously stated this product is commonly known as baking soda. Alone it has little, if any, value as a cleaner. It is sometimes used in conjunction with stronger alkachemicals to act as a buffer. However, for cleaning purposes it is just about a thing of the past. The principal use of sodium bicarbonate in the dairy field today is in conjunction with stronger alkalies as a neutralizer.

EXAMPLE: *Commercial baking soda.*

Modified Alkalies. The cleaners of this group contain mixtures of soda ash and caustic soda and sometimes silicates and phosphates. Their cleaning action is particularly good, but they have considerable corrosive action on dairy metals other than stainless steel. In hard water they may leave a lime film on the surface washed.

EXAMPLES: *Wyandotte Soda 70, Wyandotte Industrial Alkali, Wyandotte Alkali Special, Magnus Bottle Soak, Rex No. 2 Flake Alkali, Solvay Super Alkali A, Solvay Super Alkali No. 1, Solvay Super Alkali No. 3, Solvay Super Alkali No. 4, Solvay Super Alkali No. 5, Solvay Super Alkali No. 60, Solvay Super Alkali No. 65, Solvay Anchor Alkali.*

Modified Sodas. This class of washing powders generally consists of mixtures or compounds of the carbonate of soda (soda ash) and the bicarbonate of soda (baking soda) in which many other chemicals may be incorporated. The cleaning action of such products is dependent upon the combined effect of the ingredients used and manufacturing methods.

The main advantage apparently claimed for this class of cleaners is that their use is not severe upon the hands of the user. They are not as effective in hard water as some of the newer products; yet they can be used in "hard" water with better results than soda ash alone.

EXAMPLES: *Wyandotte Cleaner & Cleanser, Rex Cleaner & Cleanser, Solvay Cleansing Soda X, Solvay Dairy Cleanser.*

Explanation of Acid Cleaners Used in Washing Compounds

Generally speaking, there are two different types of acid cleaners that are used in cleaning dairy equipment, one being the so-called "waterstone-milkstone removers" and the other being the more newly developed types of acid cleaners applicable to general cleaning practices. These two general types of acid cleaner must not be confused with one another as each possesses distinctive advantages peculiar to each type.

Waterstone - Milkstone Removers. The waterstone-milkstone removers depend upon their active acidity (contributed by inhibited muriatic (hydrochloric) acid, phosphoric acid, tartaric acid, citric acid, and so forth) to dissolve the hard shell-like calcareous deposits formed on milk or cream transport cans, can washers, pasteurizer coils or plates, and so on. These deposits are mostly insoluble in alkaline solutions as they are formed because of (1) the reaction between certain alkaline cleaners and the chemical constituents of water having "permanent hardness" or precipitated by heat from water having "temporary hardness," or both (and commonly known as waterstone deposits); and (2) the interaction of such waterstone components with the milk film precipitated from milk or cream by heat on a metal surface (and commonly known as milkstone deposits).

The waterstone-milkstone removers, because of their acidic nature, are more or less corrosive to most dairy metal, particularly tin, iron and copper. Therefore, they must be used with caution according to the manufacturer's directions. After using such "removers" (which can remove tin and other metals as well as waterstone and milkstone deposits), the cleaned surfaces should be thoroughly rinsed with hot water and preferably water conditioned with a suitable alkali or corrosion inhibitor for best results. Because of their inferior detergency as well as their marked corrosive action, most waterstone-milkstone re-

(Turn to page 135)

Wetting Agents Speed Washing

Effect more thorough cleaning of fruits and vegetables, with removal of scale and fungus. Also result in better waxing

By R. W. MITCHELL
Technical Director, Magnus Chemical Co., Garwood, N. J.

REMOVAL of dirt from fruits and vegetables, plus adequate action on scale and fungus, depends on the ability of the washing solution to wet the product. This may seem a peculiar statement to many, but water is not always as wet as it might be. In the past few years, a great deal of research has been done on the subject of reducing the surface tension of the water —making the water wetter. And today there is a wide variety of synthetic chemical compounds, or wetting agents, which will accomplish this.

A familiar story is the one about the ducks that couldn't swim. Placed in water containing the right amount of wetting agent, the ducks could not swim or even stay afloat. The wetting agent allowed the water to penetrate their oily feathers, weighting them down.

Wetting action based on this principle is essential for the effective washing of fruits and vegetables, and it is even more vital in insuring proper rinsing. A solution with superior wetting power is much easier to rinse away.

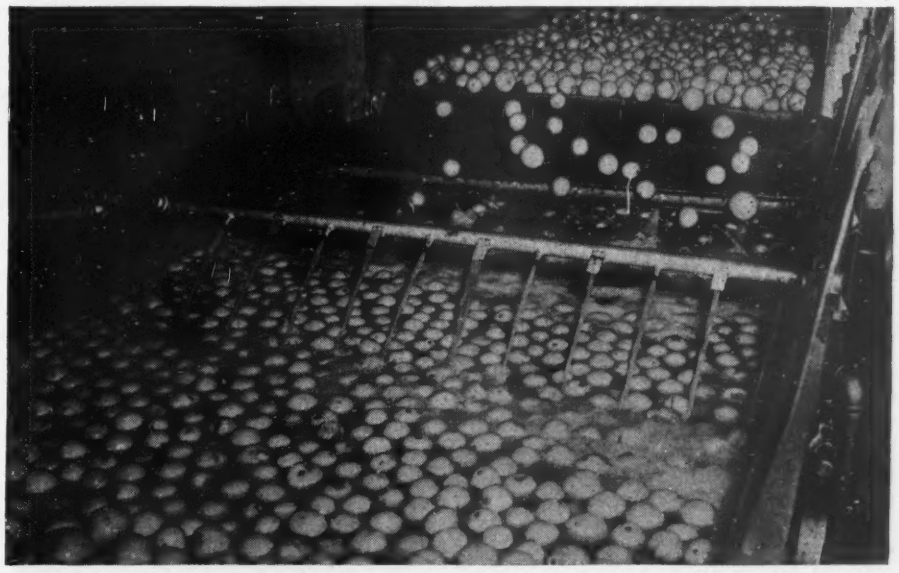
For many years the washing material most commonly used was soap, made into a suitable solution. Borax in solution was also employed. Both materials were able to do a fair job of washing, although their effects on fungus are debatable. Neither material lends itself to quick and thorough rinsing, and unless rinsing is complete and fast, fruits and vegetables dry slowly. If waxed after washing, they take the wax poorly. A poorly rinsed orange, when waxed, is inclined to have a sticky feeling which detracts considerably from its appeal.

Modern practice in vegetable and fruit washing is to use, in making up washing solutions, compounds which contain effective wetting agents. These agents are based, as a rule, on salts that provide a mildly alkaline solution comparable to that given by a soap solution on hydrolysis. This alkaline action is desirable for its effects on the natural waxes and other ingredients on the surface of fruits and vegetables, which must be acted upon if the surface is to be more than superficially cleaned. In other words, to remove all the dirt, you have to get down and slightly beyond the skin of the fruit without damaging the protection it affords.

With the added wetting ability provided by the wetting agent, fast penetration of the dirt deposits found in the natural surface coatings of the fruit or vegetable is obtained, with the speedy removal of all dirt and a material reduction in the amount of scrubbing or brushing required. Rapid wetting action and penetration are particularly useful in the removal of scale.

Another important function of the wetting agent is its action in destroying spores and bacteria. These are protected by a waxy or greasy outer layer broken only by the action of the wetting agent. It has been found that fruits and vegetables washed in a solution containing such an agent tend to show a much smaller spoilage loss in shipment, especially when properly waxed.

Solutions for washing vegetables and fruits using these synthetic compounds are relatively dilute, requiring about 1 lb. per 100 gal. of water. For hand cleaning operations, solutions may be a little stronger, although they should not require more than 1½ lb. per 100 gal. It should be pointed out that these compounds are particularly well adapted to hard water, in that they soften the water as well as increase its wetting action. Lime soaps, which are formed with ordinary soap solutions, give a scummy film which is particularly hard to rinse off. The scum does not occur when a wetting agent is used, as the lime and magnesium are precipitated in an inert form.



In washing operations such as that shown here, the use of a wetting agent in the washing solution makes it possible to clean the product quicker and better.

The cost of washing with compounds containing wetting agents should be materially below that of washing with soap or borax, in spite of the somewhat higher cost per pound of these new compounds. The cost of any washing operation is an overall figure, not merely the cost per pound of the cleaner used. Time, labor and the poundage required to make up a solution are the factors that govern overall cleaning cost. In this case, the improved quality of fruits and vegetables and their better shipping qualities overweigh ordinary cost considerations.

One final point deserving mention is the fact that solutions based on this new type of cleaning compound are very easy on the hands of workers, contributing to better working conditions in the plant.

Mechanical Treatment Destroys Insects in Foods

By E. S. STATELER, Associate Editor, "Food Industries."

Studies by government show effectiveness of this method. Simple in construction and operation, the machine can be used at several points in process to guard against infestation right up to package. Need for such treatment indicated by seizures

UNDER peacetime conditions, the estimated annual loss of $600,000,000 is an exorbitant toll to pay in food and grain supplies because of insect infestation. Under present conditions, that loss, which may become even greater because of handling, storage and shipping difficulties, is more serious than the mere monetary value involved.

Reported seizure of 14,523,506 lb. of wheat flour alone by the Federal government during the 18-month period ending Feb. 28, 1943, gives some measure of how great the menace has become. These seizures do not mean that the flour, representing some 350,000 bu. of wheat plus milling, packing and shipping expenses, was temporarily diverted from human food channels. Insect infestation, in the eyes of the Food and Drug Administration, means filth and unfitness for human consumption. Also, in the interpretation of the provisions of the Food, Drug and Cosmetic Act, any food so infested is considered adulterated and is the basis for criminal prosecution no matter in what manner or to what degree it is infested.

No longer does occasional shutting down of the plant for fumigation with gases or volatile liquids or for dry heating to 140-180 deg. F. suffice. Continuous protective and preventive measures are found advisable. These practices in no way take the place of or justify relaxation on good housekeeping practices and systematic fumigation. They are in addition to these customary practices and serve as a protection against infested materials getting into the plant and as insurance against the finished product's becoming infested between the last processing station and the packaging operation.

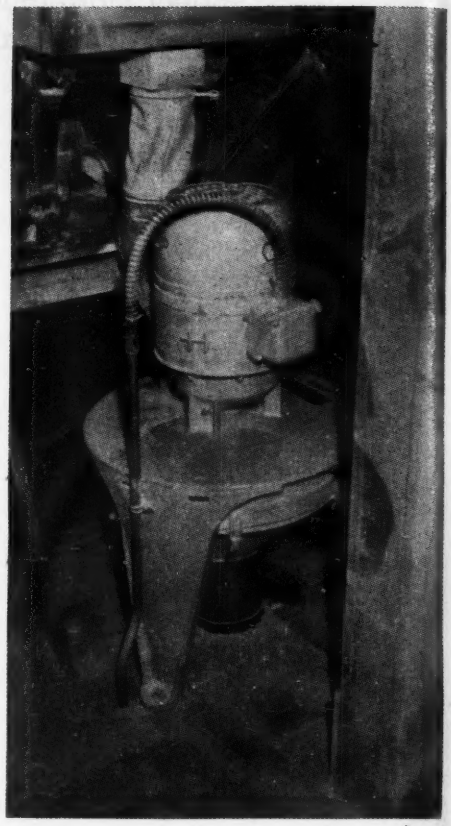


FIG. 1. As installed in a Midwestern flour-mix plant, a mechanical treating unit has a short flexible feed connection with a vibrating sieve, and it connects through the floor to an elevating conveyor.

TABLE I—Effectiveness of Mechanical Treatment in Terms of Percent Kill.

Material	Number of tests	Speed of rotor	Insect added	Number added	Percent killed
Wheat	4	3,500 r.p.m.	Rice weevil	400	100
Wheat	1	3,500 r.p.m.	Lesser grain borer	100	100
Wheat	4	2,100 r.p.m.	Rice weevil	400	99.25
Wheat	4	2,100 r.p.m.	Flour beetle	400	99.75
Wheat	4	2,100 r.p.m.	Lesser grain borer	400	99.75
Wheat	4	1,750 r.p.m.	Rice weevil	400	99.5
Wheat	4	1,750 r.p.m.	Flour beetle	400	99.5
Wheat	4	1,750 r.p.m.	Lesser grain borer	400	100
First break stock	5	3,500 r.p.m.	Flour beetle	1,000	
			Flour beetle larvae	1,000	100
			Flour beetle eggs	1,000	
Pancake flour	216	3,500 r.p.m.	Mill run from 3 plants		92.6[1]
Patent flour	5	3,500 r.p.m.	Flour beetle	1,000	
			Flour beetle larvae	1,000	100
			Flour beetle eggs	1,000	
Patent flour	1	3,500 r.p.m.	Flour beetle	1,000	
			Flour beetle larvae	1,000	100
			Flour beetle eggs	1,000	

[1] Only 2 of the 216 cartons tested contained live insects; 1 each.

TABLE II—Effect of Temperatures Below 35 Deg. F. Upon All Stages of Common Insects in Stored Grain.[1]

Insect	Days of exposure required to kill at						
	0 to 5 deg. F.	5 to 10 deg. F.	10 to 15 deg. F.	15 to 20 deg. F.	20 to 25 deg. F.	25 to 30 deg. F.	30 to 35 deg. F.
Rice weevil	1	1	1	3	6	8	16
Granary weevil	1	3	..	14	33	46	73
Saw-toothed grain beetle	1	1	3	3	7	23	26
Confused flour beetle	1	1	1	1	5	12	17
Red flour beetle	1	1	1	1	5	8	17
Indian-meal moth	1	3	5	8	28	90	..
Mediterranean flour moth	1	3	4	7	24	116	..

[1] "Insect Control Manual," by Millers National Federation.

The most recent method developed for protecting products against infestation is a continuous mechanical treatment. In the flour mill and other cereal- or grain-using plants it is applied to the grain after the customary cleaning of the grain for the removal of tramp metal, pieces of wood, weed seed, cracked and shriveled grains and other debris. During milling operations, the treatment may be applied to the tempered grain before it is sent to the break rolls and to the patent flour, clear flours and feed streams before they go to the packers or storage bins. For finished flours, prepared mixes, grits and similar free-flowing dry products, it is applied just ahead of the fillers or packers. It may also be applied for the treating of blending stocks and of returned goods.

With this method, the plant obtains some protection against infestation from incoming materials, the goods-in-process are protected against insect contamination during handling and blending operations, and the finished product is de-

livered into its marketing or shipping container with reasonable assurance of freedom from insects, eggs and larvae. The bolting or sifting that the flour receives in the production operations gives reasonable removal of live insects, larvae, the greater portion of the eggs and insect debris, particularly when 10XX silk bolting cloth in good repair is used. However, in plants with wooden floors, wooden chutes and relatively long conveyors between these finishing bolters and the packers or fillers, subsequent contamination may occur. As a result, all previous care and preventive measures against infestation would go for naught.

How It Works

The recently developed continuous mechanical treatment utilizes centrifugal force. The machine consists of a rotor formed by two circular horizontal steel plates having a 14-in. diameter. The lower plate is fixed to a hub and fitted to the shaft of the motor. The upper plate is open in the center and spaced $1\frac{5}{16}$ in. above the lower plate by two concentric rings of round steel spacers identified as impactors and having a $\frac{9}{16}$-in. diameter. There are 28 of these impactors in the outer ring and 28 in the inner ring, equally spaced. In operation the rotor has a speed up to 3,500 r.p.m.

FIG. 2. The installation shown in Fig. 1, viewed from the floor below. This illustrates an effective closed-system connection between the mechanical treating unit (the Entoleter) and a Redler elevating conveyor.

Flour or other free-flowing materials under treatment feeds into the center of the rotor as a thin film-like stream through a distributor in the inlet and is centrifugally driven through the openings formed by the two plates and the impactors. The centrifugal action throws the product against the impactors with sufficient force to disrupt the cells of the insects, larvae and eggs. Discharge is in the form of uniform spray-like streams around the rotor and into the surrounding metal casing from which the treated material is removed through an outlet spout.

Tests Show Effectiveness

Effectiveness of the treatment has been studied by R. T. Cotton and J. C. Frankenfeld, U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, Manhattan, Kan. The tests were made with tempered wheat, first break stock, pancake flour and patent flour. The mechanical unit used was the Entoleter, manufactured by the Safety Car Heating and Lighting Co., Inc., New York, N. Y.

In some of the tests the rotor was operated at 2,100 r.p.m. and at 1,750 r.p.m. As shown in Table I, the kill at these slower speeds was not as complete as at 3,500 r.p.m. But there was less damage to the wheat; the 3,500-r.p.m. speed broke the tempered wheat berries quite similar to the way a splitter roll does.

Wheat tests were carried out on 1- and 2-qt. samples, with each sample artificially infested with 100 adult rice weevils, 100 adult flour beetles or 100 adult lesser grain borers.

First-break stock tests were also carried out on 1-qt. samples, but with each sample infested with 200 adult flour beetles, 200 larvae and 200 eggs. After the stock was run through the machine, each sample was stored at room temperature for six weeks.

Pancake flour tests were made on 72 packages taken from the packing line of each of three mills using the mechanical treatment on the flour prior to packing. The 216 samples were stored three months at room temperature. Upon examination, only two of the packages showed infestation. One contained a single live rice weevil. The other contained a single lesser grain borer. Since neither of these insects is commonly found in flour, they may have been in the cartons prior to filling.

Patent flour tests were carried out on 1-qt. samples of flour. In one instance, five samples were each artificially infested with 200 adult flour beetles, 200 larvae and 200 eggs. In a second test, a quart of flour was infested with 1,000 adult flour beetles, 1,000 larvae and 1,000 eggs. In both instances the samples were kept at room temperature for six weeks without any indication of infestation when examined.

The machines are built so that they may be installed either in the top of a packer bin or on legs to permit spouting of the treated stock to one

(*Turn to page* 138)

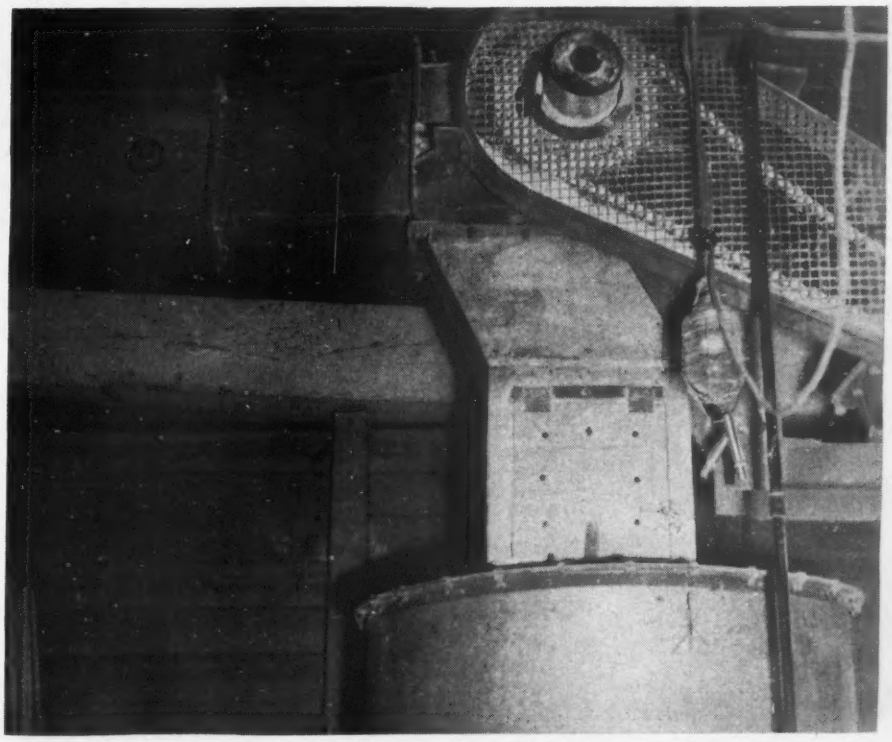


FIG. 3. To protect the product against infestation, the conveyor discharges into a metal packing bin through a short dust-tight chute equipped with a snugly fitting clean-out door

How To Meet the Demand For Better Waste Disposal

By EARL S. FENELON, Consulting Engineer, Pittsburgh, Pa.

Through legislation and the action of public health authorities, pressure has been built up for more efficient handling of wastes from industrial plants. What can be done, both now and after the war, to meet the requirements is discussed here

NO longer can the problem of sanitation and cleanliness in the food industry be considered one that may be solved by correcting the conditions within the four walls of the factory alone. It must include the hazards that the disposition of a plant's waste has on the adjacent roadside ditches, streams and other water courses as well as the town sewage treatment plant. The cost of properly disposing of this waste in most cases will prove to be a definite expense which must be taken into consideration when figuring the cost of the product produced.

Pressure has been increasing steadily for the past few years for better waste disposal on the part of industrial plants so as to eliminate stream pollution and abolish public nuisances, and while the shortage of equipment and chemicals brought about by the war may temporarily ease this pressure in certain instances, the relief at best is temporary.

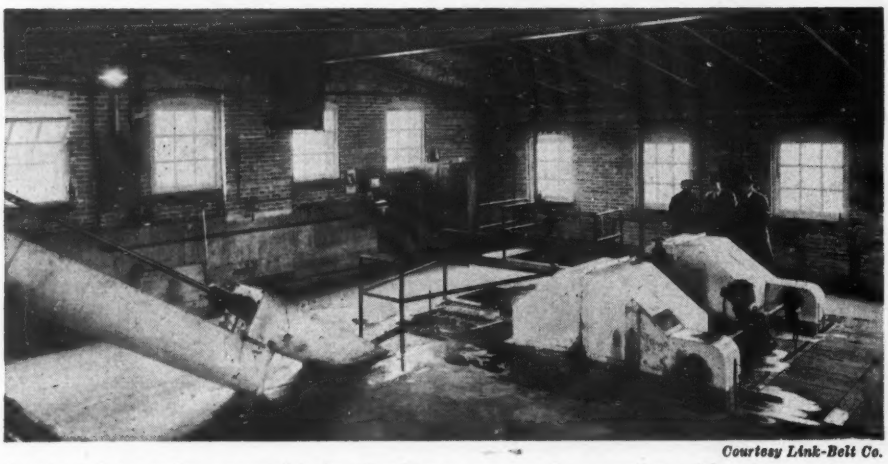
This pressure for better waste disposal has come through Federal and state legislation and the action of state and municipal boards of health. It is evidenced by the fact that up to 1940 no less than 16 bills had been introduced into Congress relative to the control of pollution of navigable waters. It is further evidenced by the standards regarding industrial waste effluent which have been established by various state and municipal governments.

To meet the cost of better waste disposal facilities, 32 states had passed acts permitting sewer rental charges prior to the present war. And one of the basis for the charge includes the volume of water consumed and the B.O.D. of the sewage discharged into the sewage facilities. This is of special significance to the food plants having a high water consumption and high B.O.D. and suspended solids content in their waste. It should lead to an analysis of production methods, so that the contaminated portion of the water used may be reduced to a minimum, or to the separation of the contaminated portion from the uncontaminated. A study should also be made of the operations causing this pollution in order to determine the best methods of handling this waste under present conditions and make plans for more adequate handling when suitable equipment becomes available.

Those branches of the food industry having contaminable waste high on the B.O.D. scale are meat packing and slaughtering, vegetable canning and allied operations (including dehydration), candy manufacturing and brewing. A detailed analysis of the content of waste from various canning operations is given in Table I. A comparison of this type of industrial sewage with that from an ordinary municipal sys-

TABLE I—Analysis of Wastes from Various Canning Operations.

Raw waste	B.O.D. 24 hr.	B.O.D. 120 hr.	Settleable solids	Suspended solids	Ash	Total solids	Ash	pH	Oxygen cons.
Tomato	415	1,150	100 c.c./l.	450	80	2,500	580	4.9	1,100
Pea	1,080	2,710	...	300	25	6,000	3,360	4.7	2,150
Pea ensilage	.....	35,000	...	.....	...	87,000	13,000	4.1	28,000
Corn	250	2,500	...	1,420	110	5,170	415	5.6	4,325
Corn ensilage	.....	27,000	...	.....	...	46,700	13,200	4.5	15,000
Lima bean ensilage	.....	25,000	...	.....	...	47,250	12,200	5.2	13,000
Wax beans	70	240	4	60	10	1,675	970	7.6	.....
Spinach	80	280	...	580	150	1,700	950	7.0	40
Carrots	.....	1,110	60	1,830	170	5,800	1,900	7.1	.....
Beets	400	1,500	35	1,600	220	5,000	800	6.0	2,700
Sauerkraut	.....	1,400	4	60	5	3,300	1,600	5.6	800
Cherry	390	750	...	20	4	4,100	1,700	6.2	.....
Grape	.....	720	25	1,650	...	2,600	880	4.6	.....
Potato	50	220	...	990	400	1,600	700	7.3	.....
Pickle	170	3,000	...	200	70	4,000	12,000	4.0	2,800



Courtesy Link-Belt Co.

Interior of screening room showing two drum screens in operation with screw conveyor removing solids screened out.

TABLE II—Composition of Average City Sewage.

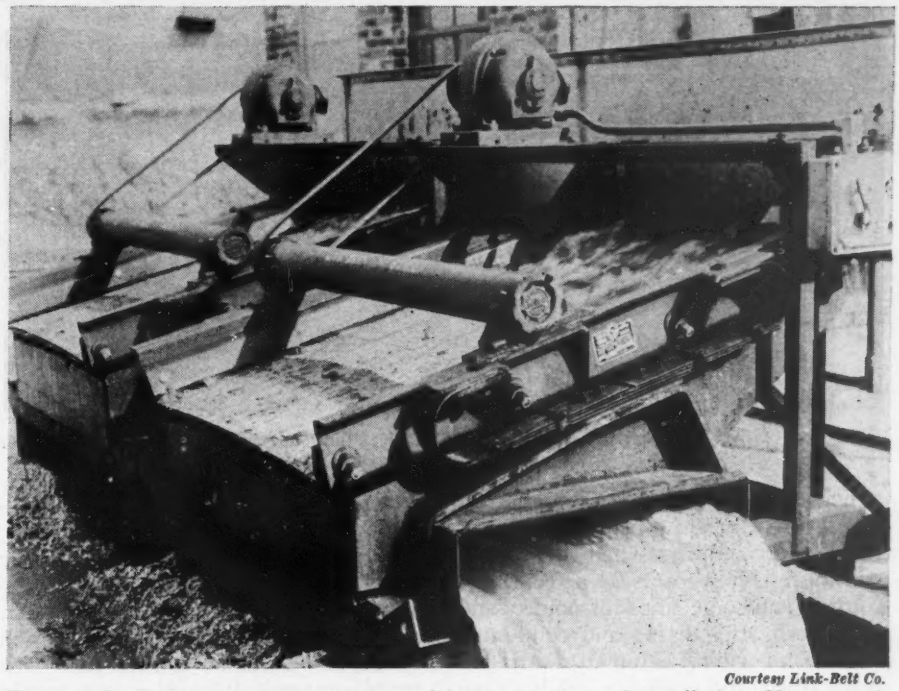
(From experiment at Coney Island, N. Y., 1935)

Turbidity	146
Total suspended solids	126
Ash, p. p. m	28
Settleable suspended solids, p. p. m.	70
Dissolved solids, p. p. m.	228
Dissolved ash, p. p. m.	72
Chlorine as chlorides, p. p. m	32
Chlorine demand, p. p. m.	7
5-day B. O. D., p. p. m.	150

tem mainly free of industrial waste is provided by Table II.

In considering the question of what can be done now in the way of solving waste disposal problems, several factors should be taken into account. One is the location of the particular plant. Will the waste be discharged into a municipal sewage system, or is the plant located in a rural district where complete treatment must be provided by the plant itself? It has been shown conclusively that where industrial waste may be handled in conjunction with regular municipal waste, it can be treated with less expense to all concerned.

Careful analysis also should be undertaken to determine the nature of each industrial waste before any conclusion may be drawn as to what is the best method to employ in detailed treatment. It may be stated generally, however, that the removal of as much of the suspended solids as possible prior to the entrance of the effluent into the municipal system or to primary treatment is almost a necessity. This is accomplished by rough bar screening followed by finer screening through a revolving North screen of 40 mesh or a similar vibrating screen. Such an operation is shown in the picture. If the suspended solids are of such fineness that they pass a 40 mesh screen, it may be necessary to resort to chemical precipitation, using a mechanical mixing chamber for the addition of the chemicals, usually lime alone or in conjunction with ferric chloride or alum. The mixed sewage and chemicals are then allowed to filter out through a settling chamber.



Courtesy Link-Belt Co.

Close-up of vibrating screens separating solids in an open-yard installation. Note unsanitary conditions created by solids.

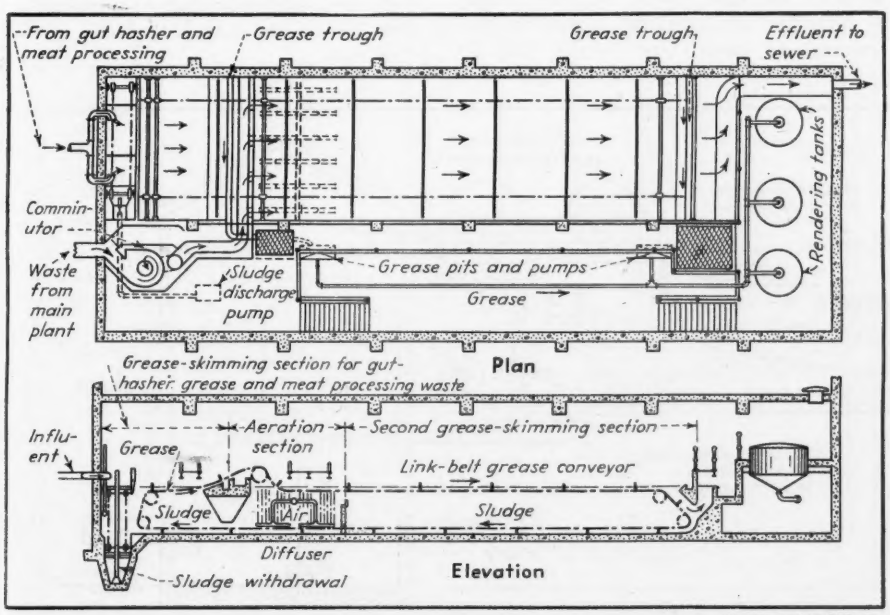
Where the industry is located beyond the limits of a town, public health authorities may require what is known as secondary treatment in the form of biological treatment over a trickling filter or some other method of oxidizing the effluent and aerating it.

The sludge collected from the primary treatment is pumped either to a drying bed of sand and allowed to dewater naturally, put through a centrifuge for dewatering or simply carted to an open field and spread on the ground for fertilizer by plowing under. One must be careful of the type of soil selected for this kind of dewatering and make certain that the liquid part of the sludge will be absorbed in the soil before it can be dispersed over the countryside by a heavy rain and pollute potable water supplies.

The first requirement in any sewage system where chemical treatment of the sewage is required is to eliminate roof and yard drainage from the sanitary and process drainage. It means just so many gallons less to be treated and may require a separate underground sewer layout. Cooling water from sterilizing operations, boiler blow-down and other such "clean" water must also be diverted to the so-called storm water sewer system.

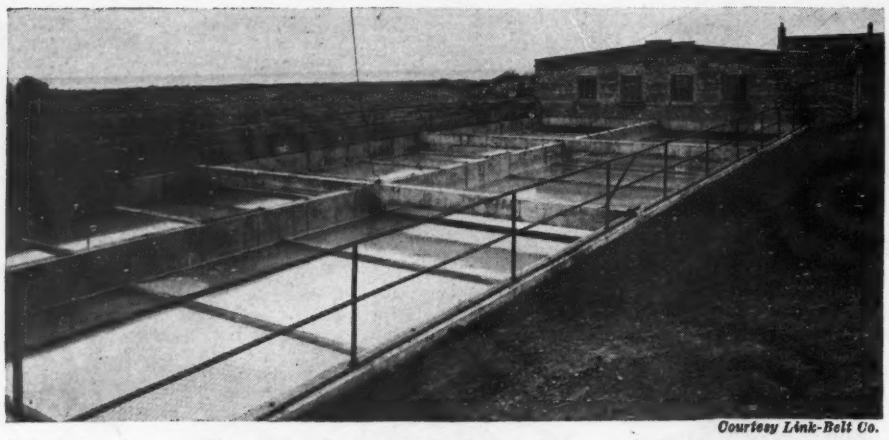
It has also been found advisable to collect liquid or semi-liquid waste which is high in suspended solids and B.O.D. and cart this away in garbage collecting wagons rather than to increase the investment in treatment facilities which may be used for only a few months in the year. This waste usually comes from kettle or pan wash, peeling operations, pulping or beating operations, starch collection from the dehydration of certain vegetables, still waste and spent grain.

The collecting and disposing of the highly contaminable waste is not always an expense, as frequently a market for the solids portion is found in



Courtesy Link-Belt Co.

Grease recovery system at Tobin Packing Co., Fort Dodge, Iowa, showing one way of making waste disposal pay for itself through conversion of waste to a valuable byproduct. The grease is skimmed from surface of liquid and the sludge removed from floor of tank to gutter at end by means of conveyor.



Courtesy Link-Belt Co.

A battery of two settling tanks showing method of settling out sludge from treated waste.

either a wet or dry state. Examples of this are in the meat packing industry, the brewery industry where the ash of still waste is sold for its 33 percent K_2O content and some slops for poultry and stock feed after drying and combining with spent grains. Tomato waste has been dried and sold for poultry and cattle feed.

One type of waste that is particularly troublesome is that produced by the pods and vines of peas, ensilage of corn husks, corn cobs and lima bean pods and vines. The strength of this waste is produced from the fermentation of the sap in the vines, pods or husks. When these wastes are stacked in the open, tests show that from an ensilage stack from 100 acres one may expect from 1,000 to 1,500 gal. per day of silage juice. The B.O.D. and suspended solids of this juice are such that it should never be taken into a sewage treatment plant but should be discharged onto open fields and plowed under before it can come in contact with drinking water for cattle or poultry.

One suggestion for preventing the silage juice from getting out of control is to excavate trenches about 3 ft. wide and 2 ft. deep where the stack will be located. Then fill the trenches with gravel or sand. Pitch the trenches in one direction and connect the ends of the trenches with wooden tanks sunk in the ground. The silage juice is pumped from these tanks into wagons or hogsheads and carted to a location where it may be dumped onto fields and absorbed into the soil. Attempts to chemically treat ensilage juice have resulted in the production of sludge almost equal in quantity to the original amount of juice, thus presenting a problem of disposing of sludge as well as liquid.

Another method of eliminating the nuisance of silage juice is to require farmers to take back to their farms a quantity of ensilage equal to the amount of pods, vines, cobs, and so forth, that they brought with them. This method has been tried with success in California and Canada and has been recommended by the Stream Control Commission in Michigan.

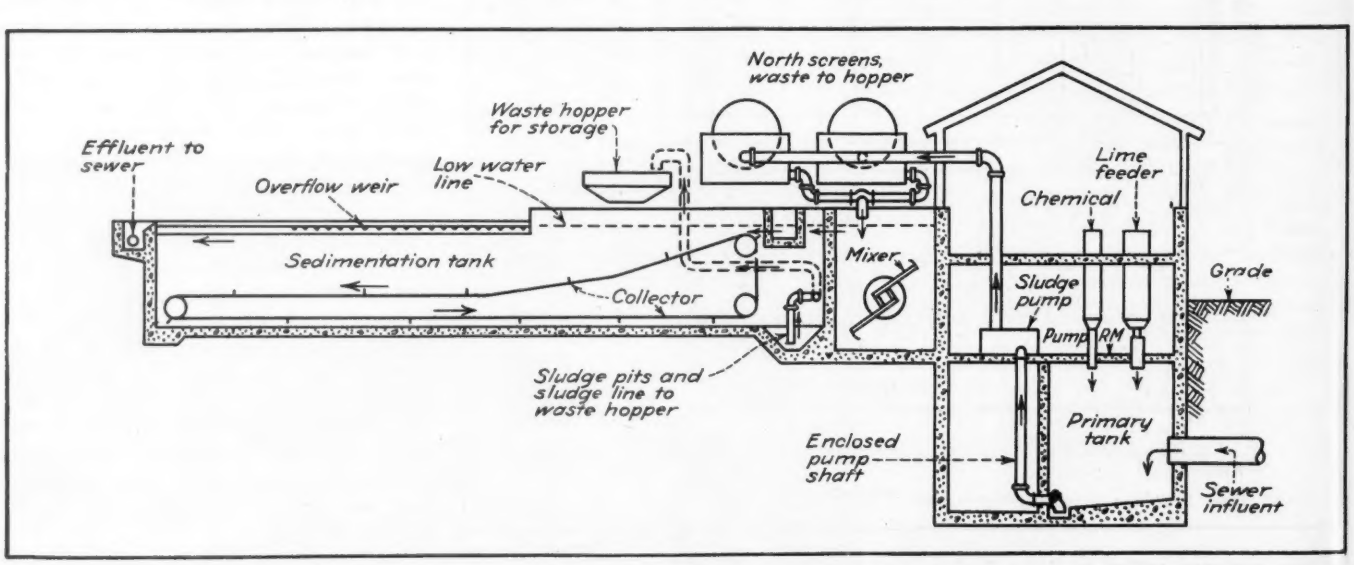
The steps that may be taken to improve waste disposal may be divided into those possible now and those to be demanded after the war ends.

Those possible now are:

1. Use as little water as possible.
2. Screen the waste through bar and 40-mesh screens to eliminate as much of the solid content as possible.
3. Collect and cart away the highly contaminable waste. Plow under on farm land or bring to a garbage disposal plant.
4. Investigate the possibility of converting the waste into a paying byproduct.

Some of the additional demands to be made when the war ends will include:

1. Complete separation of contaminated from noncontaminated liquid wastes and the discharge of the latter into a separate storm-water sewer system, and the former into a complete sewage treatment plant.
2. Complete primary treatment of contaminated waste after screening and before discharging into municipal sewers.
3. Where the B.O.D. of the liquid effluent is high after primary treatment it may be required to pass over trickling or some other type of filter for a reduction of the B.O.D.
4. Return to growers the ensilage produced from vine and husk crops for their disposal on farms and eliminate the ensilage stacks at viner stations and canning factories.
5. Sewer rentals based on the B.O.D. and volume of a particular industrial waste to pay for the construction and operation of sewage treatment plants in municipalties where the sewage is discharged into municipal sewers.



Cross section of self-contained screening, chemical treating and suspended-solids-reducing plant for treating canning waste prior to discharge of the liquid effluent into receiving streams. The capacity is 1,200,000 gal. per 20-hour day. Reduction of suspended solids is 75 to 90 percent; the decrease in B.O.D. from 50 to 60 percent. Ferric chloride and lime are the chemicals used.

New Vacuum Flotation Process Aids Liquid Waste Disposal

By A. J. FISHER, Development Department, The Dorr Co., Inc., New York, N. Y.

Bulk of suspended matter may be removed from liquid wastes from fruit, vegetable and fish canneries and packing houses, permitting discharge into municipal sewers or providing pretreatment ahead of precipitation or biological oxidation

DISCHARGING liquid wastes from food processing establishments into municipal sewer systems invariably causes trouble at the sewage treatment plant. These difficulties are caused not only by the increased organic load imposed upon biological oxidation devices, but also by the effect of the wastes on the preliminary sedimentation step that invariably precedes oxidation. In many cases where stream conditions permit, sedimentation is the only treatment step employed.

A considerable portion of the solids in waste waters from fruit and vegetable canneries tends to float rather than settle, because of their acidity and rapid fermentation. The same effect is obtained in the case of fish and meat packing wastes because of their high oil and grease content. When these materials float, they carry along with them a large portion of sewage solids that would normally tend to settle. The next effect is an unsightly and odorous condition that disrupts routine plant operation.

Although conventional sedimentation tanks are equipped with skimming devices, such skimmers leave much to be desired, although some may be more efficient than others. Their use is futile when they must cope with the large amount of scum that forms when cannery wastes are present. There have been cases where entire municipal plants had to be shut down during canning seasons because of this condition.

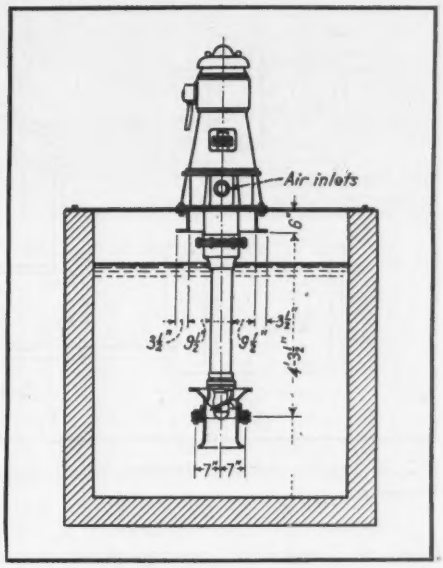


FIG. 1. Type of mechanical aerator used at West Coast cannery. The rotating propeller causes a suction, and air is drawn down through the hollow shaft.

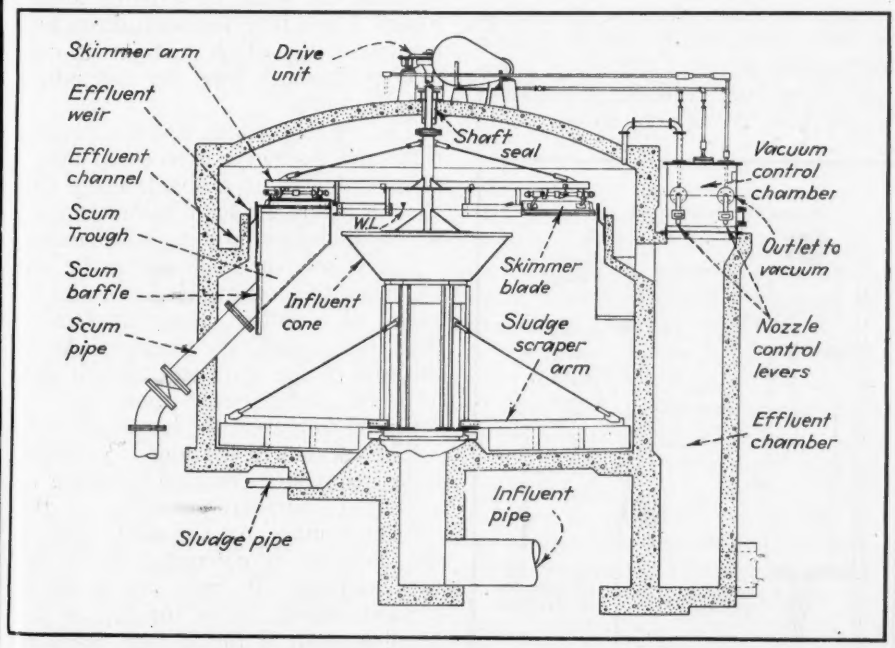


FIG. 2. The Vacuator. Cylindrical tank with dome-shaped cover is under constant vacuum of about 9 in. of mercury. Liquid waste enters a central draft tube from which it is distributed by means of a flared-top section. Floating solids, buoyed up by fine air bubbles, are skimmed from the liquid surface and carried to a trough. Settled solids are removed from the bottom with a scraper mechanism.

To alleviate these conditions, pretreatment of the wastes is highly desirable, and in fact is required in many localities. The same problems, however, exist where a cannery treats its own waste waters, to take an example. Often the pretreatment plant functions so poorly because of scum formation in settling tanks that the pretreatment plant might just as well have never been built.

A study of cannery waste-treatment problems on the West Coast indicated that the vacuum flotation offered the best possibility for removing the bulk of the suspended solid matter from this material. This method utilizes to advantage those factors which normally interfere with settling, and has now progressed to a point where it can be considered as a valuable adjunct in the treatment of many industrial waste liquors, as well as municipal sewage. Laboratory and pilot-plant experiences have resulted in the design of equipment for use in this system. Twenty-nine units are either operating or being installed at municipal and industrial establishments. Two of these are operating on fruit and vegetable cannery waste, and a

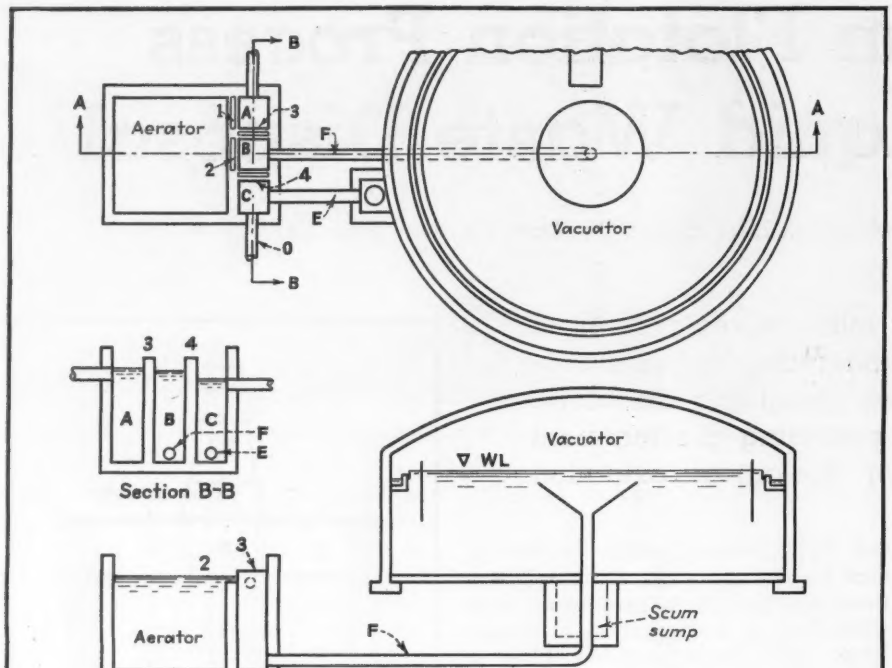


FIG. 3. Typical vacuum flotation installation, which consists of an aerator, deaerator and Vacuator.

third at a municipal sewage plant that receives cannery waste. Four additional units are for the removal of grease and light solids from municipal sewage.

Principles of Vacuum Flotation

When a liquid is aerated, the larger air bubbles rise rapidly and escape to the atmosphere, while the finely divided air liberates itself very slowly at ordinary pressures. If the liquid is subjected to a vacuum immediately after the large bubbles have escaped, the minute bubbles are rapidly released in a very fine form and attach themselves to light suspended solid particles. This causes the solids to be lifted to the surface, from which they may be readily removed. The unit in which the flotation step is carried out has been called a "Vacuator." The three component parts of a Vacuator system are the aerator, the deaerator and the Vacuator.

Aerator. To obtain the maximum flotation of solids in a Vacuator system, it is necessary in most cases to preaerate the feed prior to its introduction into the Vacuator tank. Conventional types of air diffusion or mechanical aerators as used in the treatment of sewage may be employed. For best results it is desirable to aerate rather violently, so that a maximum amount of finely divided air bubbles is entrained. Units such as are regularly used in flotation work in chemical and metallurgical fields are in commercial use and have proved very effective. The amount of air required for ordinary conditions is estimated to be 0.025 to 0.05 cu. ft. per gallon of waste water treated. The aeration period provided at average flow may be as low as 30 seconds.

Figure 1 shows the type of unit in use at a West Coast cannery. Here a nonclogging propeller rotates on a vertical hollow shaft. A suction is produced by the propeller which causes air to be drawn in through the shaft. This air is broken up into minute bubbles by the action of the propeller and is diffused throughout the liquid passing through the tank.

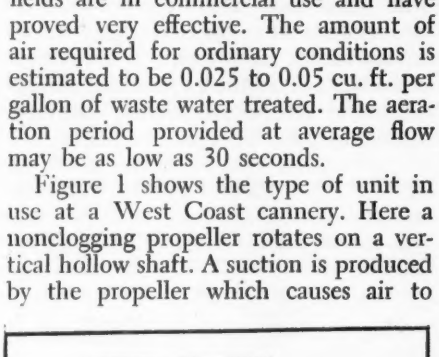


FIG. 4. Laboratory set-up for making vacuum flotation studies.

Deaerator. The purpose of deaeration is to release the larger air bubbles before the aerated material is fed to the Vacuator. If this is not done, the large air bubbles present in the feed would cause undue disturbance at the Vacuator surface. This would result in the detachment of the small air bubbles that float the light solids with a consequent lowering of flotation efficiency.

Deaeration takes place very rapidly and may be accomplished readily in a few seconds by passing the aerator effluent through a small compartment, connecting channel or tank which acts as a feed chamber for the Vacuator.

Vacuator. The Vacuator, as shown in Fig. 2, consists of a cylindrical tank with a dome-shaped cover. The tank may be constructed of steel or concrete. A vacuum of about 9 in. of mercury is maintained in the unit. The feed enters the tank through a central draft tube, which distributes it by means of a vertical flared-top section close to the liquor surface. The floating matter buoyed up by the fine air bubbles collects on the surface and is removed continuously by means of a skimmer which moves the scum around to a trough, the top of which is slightly higher than the liquid level. The skimmer blades are hinged to two or more radial arms, which permit the blades to push the scum up a ramp to the trough. From here the scum drops to a barometric leg which permits its continuous discharge from the unit into a suitable sump.

The effluent passes under a circular baffle and discharges over a weir into a peripheral effluent channel. From this channel it passes to a barometric leg which discharges to a sealed chamber.

Coarse solid particles that settle out are raked to a central sludge outlet by means of a bottom raking mechanism that rotates with the skimmer. As in the case of the scum and effluent outlets, the sludge outlet must also be sealed off to prevent the loss of vacuum.

The vacuum in the unit is automatically maintained constant by means of a control chamber connected to the effluent launder. An adjustable pipe in the chamber is connected to a wet vacuum pump. Its open end is set at a point slightly below the top of the overflow weir. If the vacuum tends to rise, the liquor levels in the effluent barometric leg and the effluent channel also rise. As the liquid seals off the open end of the vacuum pipe, the pump draws water until the vacuum again

drops to a point where the end of the vacuum pipe is just above the water level. Due to the peripheral overflow weir, the liquid level in the main tank cannot rise, even though the vacuum is increased, unless the effluent channel first fills up and the overflow weir becomes submerged.

General Layout

A flexible aerator, deaerator and Vacuator arrangement is shown in Fig. 3. Waste liquor enters compartment A and flows to the aerator tank over the adjustable sill 1. Aerator effluent passes over the adjustable sill 2 into the deaerator *B*, from which it flows to the Vacuator. The Vacuator effluent flows to the sealed compartment *C*, from which it is sent to further treatment. Stop planks at the top of the division walls 3 and 4 between compartments *A* and *B*, and *B* and *C* may be so adjusted in height that excessive flows will be automatically bypassed around the aerator or Vacuator tanks. The arrangement also permits complete bypassing of either or both units. It will be noted that sufficient liquid depth is maintained over the Vacuator feed and effluent pipes *F* and *E* so that it is impossible to cause a sudden drop in vacuum in the Vacuator tank due to the admission of air at either point. The volumetric holding capacities of compartments *B* and *C* should be at least as great as the capacities of pipes *F* and *E*, respectively.

The elevation of the Vacuator floor is approximately the same as that of the water level in the aerator. The water level in the Vacuator is, therefore, 10 ft. 3 in. higher, this being equivalent to the 9-in. Hg vacuum maintained in the unit. The actual loss of head is equal to the friction loss in the feed pipe and the loss over the effluent weir. Normally this head loss should not exceed 6 to 9 in. Probably the best way to visualize the hydraulic operation of the Vacuator is to consider it as a closed siphon. It will then be apparent that the liquid flows by gravity through the entire system and that pumping is not required. The only power required to maintain the high water level, once the tank is filled, is that for exhausting the air liberated in the unit. For a 20-ft. diameter tank operating at a 10,000 gal. per square foot per 24 hours overflow rate, this amounts to only about 0.5 hp. per million gallons of liquid treated.

In the treatment of fruit and vegetable cannery waste, the waste liquor should first be screened or passed through a disintegrator in order to remove or break up large particles. The skimmings may be disposed of by anaerobic digestion and sand-bed drying or by drying direct. In the latter case the pH value should first be adjusted to about 9.5 by the addition of lime to facilitate dewatering. This may be done in the scum sump or in a small storage tank.

In the treatment of fish cannery or meat packing house waste, a high degree of treatment may be obtained by adding a coagulent such as alum or ferric chloride to the aerator.

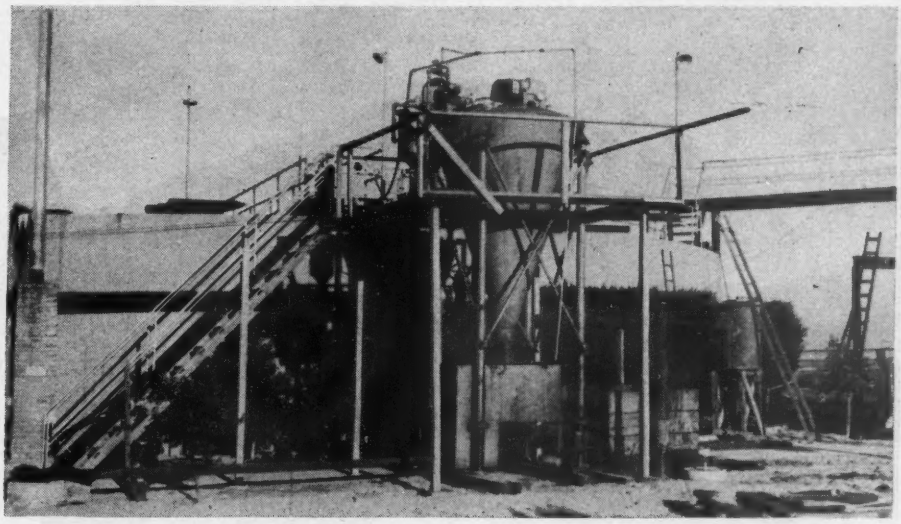


FIG. 5. Pilot-plant installation of a Vacuator used in the Los Angeles tests.

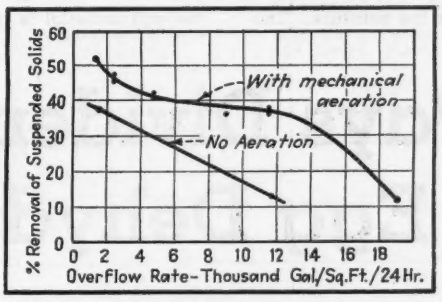


FIG. 6. Terminal Island (Los Angeles) pilot-plant test data showing effect of increased flow on suspended solids removal. Data are on sewage containing fish cannery wastes.

Laboratory Studies

Laboratory studies to demonstrate the efficiency of vacuum flotation in the treatment of sewage and various types of industrial wastes have been made in an apparatus as shown in Fig. 4. Here the sample is introduced into the separating funnel and aerated by violent shaking for about 30 seconds. The funnel is then supported on a ring stand and the desired vacuum applied through connection *B*, pinch clamp 1 being closed. The degree of vacuum is adjusted and maintained by regulating the screw clamp on a connection open to the atmosphere. Pinch clamp 2 is then closed. The vacuum in the cylinder is then raised slightly by closing down on the screw clamp. Pinch clamp 1 is then opened. This draws a sample over from the funnel to the cylinder. The first portion drawn over is discarded, tube *A* having been filled up with water at the start of the test to prevent the pulling back of air from this tube into the funnel. In this way an undisturbed sample is obtained for analysis without shutting off the vacuum in the separating funnel. This is absolutely essential since the shock of interrupting the vacuum causes some of the floated scum to settle.

Tests on a variety of fruit and vegetable cannery waste with this apparatus indicated suspended solids removals ranging from about 79 to 98 percent. A typical test on tomato waste gave the data in Table I.

TABLE I—Data from Test on Tomato Waste.

Fraction	P.p.m. suspended solids in	Distribution of solids (percent)	Percent removal
Feed	4,105	100	....
Float	50,000	91.3	97.7
Sludge	.....	6.4	
Effluent	100	2.3	....

TABLE II—Laboratory Tests on Cannery Wastes Showing Removal of Suspended Solids.

Material	Influent (p.p.m.)	Effluent (p.p.m.)	Percent removal
Tomatoes	4,105	100	97.7
Pears	2,175	270	88.5
Asparagus	1,050	140	87.2
String beans	1,195	165	86.6
Spinach	1,034	240	78.7

It will be noted that most of the solids removed appeared in the float. This same characteristic was indicated with spinach waste. In the case of pears and string beans, the ratio of suspended removed as float to that re-

(Turn to page 138)

Photo from Three Lions

Looking down into the spray-drying room of an egg powder plant. The liquid eggs are sprayed into the top of the cone shown above the workman, where circulating hot air removes the moisture. The powder drops to the bottom of the cone and is carried away by a worm conveyor. At right and left are agitating vats from which the egg material is pumped to the top of the spray chamber.

Sanitation Pays Dividends To the Egg Dehydrator*

By HARRY E. GORSELINE, Senior Bacteriologist; L. S. STUART, Bacteriologist; and VERNON H. McFARLANE, Associate Bacteriologist

Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

It is often the difference between a Grade A and a Grade B product, which means a difference in the manufacturer's profit. It plays an important role in nearly all operations in the plant, and laxity may result in a product unfit for table use

EGG drying has become an important war industry and is providing nourishing food in a form that can be handled, shipped and stored under wartime conditions. The product is used for such dishes as scrambled eggs, omelets, custards, and so forth, in which the predominating flavor is egg. Since this is the case, flavor and table quality are among the most important characteristics which dried egg should possess. High quality is governed largely by the character of the raw material used, the methods of handling of the liquid, drying, and conditions of storage. In nearly all of these operations sanitation plays a very important role and improper or lax methods of handling may result in a product unfit for table use.

The practice of good sanitation pays dividends because it safeguards and preserves the quality of the product. The chemical composition and the hydrogen ion concentration of whole egg are such that they make this food an ideal medium for the growth of bacteria. Unless eggs are handled rapidly and under conditions which retard or eliminate the growth of bacteria, the product will deteriorate in edible quality very rapidly. Good sanitation in the egg-breaking plant is of the utmost importance.

Eggs as they are laid are, for the most part, sterile. Horowitz[1] and Rettger[2] showed many years ago that in nearly all cases the oviduct of the hen was sterile, and Stuart and McNally[3] have more recently added to this information in studying the role of the shell in preventing infection of the egg. Unpublished results of this laboratory have shown that when strictly fresh eggs are opened under aseptic conditions it is rarely that one is found containing bacteria. Thus, to start with, we have a food product which contains no bacteria. The contamination and spoilage which occur later are due entirely to conditions which contribute to bacterial infection.

Stuart and McNally found that when bacterial cultures were painted on the shells of newly laid eggs there was rapid penetration to the shell membrane and subsequently into the meat of the egg. Since almost all egg spoilage is due to the growth of bacteria, the value of sanitation in the chicken yard and nests and in the handling of eggs can be seen. If nests are allowed to become very dirty or are located where they can become wet, they will be sources of bacterial contamination and the rapid spoilage of shell eggs can be expected.

*Agricultural Chemical Research Division Contribution No. 113.

Eggs produced under sanitary conditions, kept dry and chilled for storage will have a very low loss upon candling and breaking.

Dirty eggs should be segregated and handled separately. Dirty eggs will contaminate other eggs through contact and through breakage in the case or in handling. Such eggs should be washed and broken out at once under sanitary conditions. If this is done almost all can be salvaged, but if they are held or placed in storage considerable loss can be expected. Eggs which have been washed by ordinary methods should not be stored, since the washing causes bacterial penetration of the shell, and spoilage will take place in storage. Uncandled current receipts should never be placed in cold storage for there will be undue loss through the formation of bacterial rots. Sanitation pays dividends in the handling of shell eggs by leading to a higher percentage of edible eggs of high quality.

Breaking-room Sanitation

Sanitation and hygienic handling of liquid eggs should be the keynote of all breaking-room operations. Good-quality eggs must be available to start with if good-quality dried eggs are to be produced. Once the shell of the egg is broken and the contents mixed, the stage is set for rapid bacterial multiplication, and the rapidity of growth is governed by the amount and type of initial contamination, the temperature at which the liquid is handled, and the time it is held. If good eggs are used and proper sanitation is practiced, the initial contamination will be light and the chances for rapid deterioration will be lessened. Dirty equipment and containers, pipelines and pumps which have not been taken down and cleaned, and faulty gaskets and packing are among the greatest enemies that quality can have. As soon as bacterial growth starts, undesirable changes are produced and these lead to rapid deterioration of edible quality. When liquid eggs are held at room temperature for even a few hours, enormous populations of bacteria will develop, resulting in bad off-odors and flavors, and dried eggs made from such liquid will be inedible.

Occasionally, conditions arise where the bacterial population of the liquid may be 100,000,000 or more per cubic centimeter. Such is a clear indication of carelessness and lack of proper sanitation in handling in almost all departments of the plant. It is true that when storage eggs are used the plate counts are likely to be higher than during the season when current receipts are being broken, and that there is a tendency also for storage eggs to be rated somewhat lower on a palatability score.

TABLE I—Bacterial Count Changes at Various Holding Temperatures With Churned Fresh Whole Egg (From Sound Shell Eggs).

Time of holding (hours)	Holding temperatures, deg. F.							
	30	35	40	45	50	55	60	65
0	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
1	3,300	3,000	3,800	2,600	2,400	3,200	3,400	3,600
2	3,100	3,200	5,900	3,500	3,100	3,400	3,100	2,800
3	2,600	3,600	6,500	3,200	3,000	3,300	3,800	3,600
4	3,800	3,700	8,800	2,800	3,000	3,100	3,200	3,700
5	3,500	2,500	10,300	2,600	2,900	3,100	4,500	2,900
6	3,000	3,200	10,100	3,100	3,400	4,400	3,500	3,100
8	3,800	3,400	10,200	4,700	3,500	4,800	14,300	15,000
10	2,900	3,700	10,300	4,600	3,300	12,800	36,000	44,000
12	2,400	3,700	8,400	5,200	4,600	13,700	35,000	42,000
24	2,100	2,300	9,700	12,900	12,400	22,200	43,000	123,400

TABLE II—Bacterial Count Changes at Various Holding Temperatures With Churned Fresh Whole Egg (From Checks, Cracks and Leakers).

Time of holding (hours)	Holding temperatures, deg. F.							
	30	35	40	50	50	55	60	65
0	25,500	25,500	25,500	25,500	25,500	25,500	25,500	25,500
2	17,000	22,000	16,000	18,000	28,000	37,000	55,000	91,000
4	21,000	22,000	23,000	31,000	64,000	79,000	98,000	146,000
6	24,000	29,000	56,000	98,000	95,000	83,000	124,000	250,000
8	23,000	26,000	67,000	104,000	155,000	283,000	314,000	640,000
10	25,000	23,000	58,000	192,000	340,000	420,000	640,000	1,200,000
12	38,000	44,000	69,000	195,000	1,570,000	6,200,000	7,600,000	12,500,000
24	49,000	65,000	75,000	460,000	3,800,000	11,900,000	55,000,000	190,000,000

TABLE IV—Bacteria Counts on Churned Whole Cold Stored Eggs After Holding at 30 Deg. F. for Varying Periods of Time.

Time at 30° F. prior to freezing	Eggs out of 6 weeks' cold storage. Low count	Eggs out of 6 mos. cold storage. Medium count	Eggs out of 6 mos. cold storage. High count
Hours	Bact. count per ml.	Bact. count per ml.	Bact. count per ml.
0	2,800	180,000	11,000,000
6	2,600	189,000	47,000,000
12	2,100	190,000	55,000,000
24	3,400	210,000	68,000,000
36	19,000	168,000	135,000,000
48	16,000	150,000	248,000,000
60	58,000	188,000	440,000,000
72	62,000	200,000	420,000,000

Effect of Temperature

Temperature accelerates the rate of bacterial growth. This was demonstrated during studies on the freezing of eggs,[4] and it can be seen from Table I that when low-count liquid eggs were held at various temperatures the rate of growth increased with the rise in temperature. But because they were good eggs to start with, the amount of increase, even at 65 deg. F., was not marked. When eggs of higher contamination were employed in the experiments, the increase became much more pronounced, as is shown in Table II. This table indicates clearly why it is advocated that liquid egg be held at a temperature below 45 deg. F. at all times, since it can be seen that the rate of multiplication is rather constant up to 40 deg. F. but that at 45 deg. F. and above the rate increases rapidly.

When eggs of very high bacterial count were used, such as would be expected in a plant having poor sanitary practices, the rate of increase was rapid even at 30 deg. F., and reached startling proportions at higher temperatures. This is shown in Table III.

These three tables demonstrate that, when good sanitation is practiced and good-quality eggs are used, the liquid can be held for longer periods of time without deterioration than when methods conducive to high bacterial counts are used. The eggs used for Table I showed almost no growth when held at

(Turn to page 140)

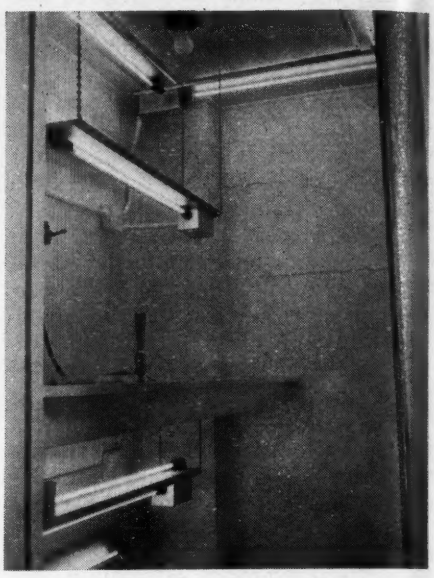
TABLE III—Bacterial Count Changes at Various Holding Temperatures with Churned Whole Egg (From 6 months' Cold Storage Eggs).

Time of holding (hours)	Holding tempreatures, deg. F.							
	30	35	40	45	50	55	60	65
0	7,100,000	7,100,000	7,100,000	7,100,000	7,100,000	7,100,000	7,100,000	7,100,000
2	31,100,000	43,400,000	46,400,000	51,400,000	61,600,000	43,800,000	53,200,000	63,400,000
4	25,400,000	30,600,000	57,400,000	57,800,000	48,600,000	55,800,000	64,000,000	69,000,000
6	35,400,000	34,000,000	54,000,000	58,000,000	46,000,000	55,200,000	59,000,000	61,200,000
8	11,400,000	43,800,000	43,000,000	68,000,000	64,000,000	74,000,000	66,000,000	62,000,000
10	42,000,000	22,000,000	36,000,000	38,000,000	124,000,000	67,000,000	168,000,000	89,600,000
12	276,000,000	340,000,000	215,000,000	178,000,000	93,000,000	135,000,000	151,000,000	190,000,000

Tests Show Bactericidal Power Of Ultraviolet

By DALE W. JOHNSON and C. G. HARREL,
Food Research Department, Pillsbury Flour Mills Co., Minneapolis, Minn.

Studies made in specially built inoculation room yield quantitative data heretofore unavailable. A 95 to 99 percent kill of bacteria is obtained with 30-minute exposure of room atmosphere to the ultraviolet radiation, without air circulation



Eight ultraviolet lamps were installed in the Pillsbury inoculation room in such a way that no shadow area existed.

FACED with many and varied bacteriological problems in its work, the staff of the Pillsbury foods research laboratory had need for handling pure cultures, study cultures and test samples under aseptic conditions.

A step in meeting that need was the building of a special inoculation room constructed to have only smooth, non-dust-adhering interior surfaces and arranged to keep air currents to a minimum. According to our test data, the most significant step taken was the equipping of the room with a battery of ultraviolet lamps producing an emanation known as a "bacterial radiation."

Test data show that, even when the air of this room has been heavily seeded with microorganisms, a 95 to 99 percent kill is obtained during a 30-minute exposure of the room atmosphere to the ultraviolet radiation.

While the details of installation and test data may not apply to all food processors who have bacteriological control problems, they may suggest to others various ways in which similar installations may be used effectively in the laboratories and production departments.

The room itself is 4 ft. wide, 6 ft. long and 7 ft. high, with a smoothly varnished workbench on one side and a single swinging door near the end corner diagonally across the room from the bench. The walls and ceiling are covered with a glossy, hard-surface white paint. The floor is of a smooth-surfaced, nondusting concrete construction.

The ultraviolet installation consists of eight 30-watt lamps of a comparatively recent development. They differ from ultraviolet generators which aid in the formation of vitamin D by irradiation or that find application in photography and that form atmospheric ozone capable of destroying undesirable odors and of purifying water. These lamps consist of special glass tubes in which is produced a low-pressure mercury discharge. During passage of an electric current the lamp gives off light rays with about 80 percent output at 2,537 angstroms,[1] which is only 10 percent below the most highly lethal wavelength in the bacteria-killing ultraviolet band.

As installed in this special inoculating room, three lamps are fastened to the ceiling, one is on the back wall between the ceiling and workbench, one overhangs the middle of the bench, one is on the back wall between the bench and the floor, and two hang back-to-back beneath the bench to irradiate the underside of the bench as well as the floor. By such an arrangement, the room space and surface areas receive an exceedingly high level of irradiation.

This arrangement was decided upon as a part of the study project of the laboratory staff to determine: (1) How much exposure to the lights is necessary to kill bacteria? (2) Do different kinds of bacteria respond differently to the lights? (3) Does proximity to the lights affect the killing power? (4) Would the use of an electric fan help to get a complete kill of microorganisms present?

In the several years that these lamps have been commercially available they have been accepted by food handlers and processors throughout the country. Meat dealers have been using them to aid in keeping their meat fresh and of good flavor during storage in refrigerators and show cases. Some bakers have found them helpful in cutting down mold counts in cooling and wrapping rooms, and milk bottlers are using them to obtain improved and longer keeping milk. Research engineers also have been studying their effectiveness under various conditions and with various organisms.

Although studies had shown that one 30-watt lamp installed in the center of a 4,000-cu. ft. room in such a way as to irradiate the upper half of the room produces a sanitary ventilation equivalent to 100 air changes, and other data have been given in published bulletins, additional quantitative data were needed to determine the effectiveness of these lamps for use in a special type of inoculating room.

In fermentation work, technological control is heavily dependent upon the use of pure cultures of the fermenting organisms. An important factor in keeping these cultures virile and available in needed quantities is the making of frequent transfers from control cultures.

Another factor in bacteriological control over processed foods is plate and culture testing to determine the identity and number of microorganisms present in the various ingredient materials, in the goods-in-process at various processing stages and in the finished food.

As in the case of transferring pure cultures, successful and dependable

[1] An angstrom is one hundred-millionth of a centimeter.

microbial testing of foods depends upon aseptic conditions in the inoculating room.

For that reason the lamp installation in this inoculation room was subjected to extreme as well as systematic testing to determine its effectiveness. Briefly summarized, the testing procedure consisted of contaminating the room with mold spores and bacteria, exposing Petri plates in the room both before and after turning on the lights and counting the microorganisms on the plates after incubation at optimum temperature for microbial growth. The plates were exposed for varying periods, as shown in Tables I to VIII.

Although exception might be taken to the technic used in determining air counts as being not absolute or error-proof, the procedure is simple, convenient and readily shows the relative effectiveness of the lights.

Data shown in Tables I to IV were obtained by contaminating the room and then allowing the air to remain quiet for 30 minutes. After the quiet period, all of the plates were introduced into the room at one time, uncovered for exposure during a prescribed period, and recovered preparatory to removal and incubation. Although the control plates were never opened, contamination resulted because of the high concentration of microorganisms in the room.

In Tables V to VIII are data obtained by introducing the plates into the room, exposing to the air, closing immediately and removing promptly from the room. Controls were placed in the room both before and after turning on the lights. Those placed in the room at the beginning were contaminated, while those placed in the room after the lights had been used remained sterile.

Since the rate of killing mold spores and bacteria is conceded to depend upon nearness of the microorganisms to the light, tests were run to determine the effect of moving the air in the room by a fan to bring the organisms in closer and more frequent contact with the lights. Results of those tests are shown in Table VI and VII. In both instances the organism used was *Aspergillus niger*, and in neither instance was the fan running when the exposure was made.

To be more certain that the lowered counts resulted from the effect of the lights and not because the spores settled out of the air, the room was contaminated and the plates were exposed for varying periods without turning on the lights. Results of that test are given in Table VIII and show that the lowered counts result from the effects of the lights.

Reviewing the results of the tests, the percent kill of mold spores and bacteria as calculated for the various tables are as follows: Table I, 93 percent; Table II, 98; Table III, 95; Table IV, 98; Table V, 99+; Table VI, 99 with fan, 99+ without fan; Table VII, 99 with fan, 99+ without fan.

Table I indicates that plates which were opened when the lights were turned on and closed just before the lights were turned off were not sterile. However, the count on the plates exposed for 30 minutes with the lights on was much less than on plates exposed for 5 minutes before the lights were turned on. These results check with the data in Table VIII to show that the decreased counts were not the result of organisms settling out of the air.

Data in Tables VI and VII show no great difference in percentage of kill when the lights were on with the fan running and when the lights were on with the fan off.

Although the data is not presented, results of tests showed no difference in the counts obtained when the plates were exposed from outside the room and when exposed by entering the room and making exposures by hand. Results presented in all tables show that a marked decrease in count is effected by the lights.

On the basis of the results, these conclusions can be drawn: (1) The use of bactericidal ultraviolet radiation is of definite value in cutting down microbiological contamination. (2) A 30-minute exposure of the room to the light results in an effective kill of at least 95 to 99 percent. (3) Exposure of plates from outside the room or by entering the room makes no difference in contamination of the plates. (4) Circulation of the air by means of a fan while the lights are on does not result in greater killing effects. (5) With today's war on waste, bactericidal ultraviolet radiation can become a vital tool in the hands of the food processors. It makes increased production possible by further reducing the spoilage and contamination losses.

TABLE I

Aspergillus niger spores blown from plate by fan for 10 minutes. Room quiet 30 minutes. Plates exposed from outside of room. All plates were put into the room at once.

	Average count
Plates exposed 5 min. before lights and closed	1,000+
Plates exposed 5 min. before lights and open while lights were on 30 min.	1,000+
Plates opened when lights were on and left open until just before lights turned off	40
Plates exposed 30 min. after lights off.	70*
Controls	2

* In this case one of the 7 plates exposed showed a count of 500. If this plate were omitted from the average, the count after the lights would be 7.

TABLE II

Penicillium No. 1 grown on Czapek's media and sprayed into room. Fan on 5 min. and room allowed to stand quiescent for 30 min. All the plates were in at the start and exposures made from outside the room.

	Average count
2½ min. exposure before lights	500+
5 min. exposure before lights	1,000+
Lights on 30 min.	
5 min. exposure after lights	20
30 min. exposure after lights	22
Control	8

TABLE III

Bacillus mycoides grown on nutrient broth 4 days sprayed into room. Fan on 5 min. and room allowed to stand quiescent 30 min. Exposures made by entering room. All plates in room before exposures.

	Average count
2½ min. before exposure to lights	188
5 min. before exposure to lights	422
Lights on 30 min.	
5 min. after exposure to lights	20
30 min. after exposure to lights	24
Control	26

TABLE IV

Mucor spores blown from a plate by the fan for 5 min. Room allowed to stand 30 min. Plate exposed by entering the room.

	Average count
2½ min. before exposure to lights	74
5 min. before exposure to lights	102
Lights on 30 min.	
5 min. after exposure to lights	2
30 min. after exposure to lights	4
Control	5

TABLE V

Aspergillus niger spores were blown into the room by a fan for 5 min. The room was allowed to stand quiescent for 30 min. Exposure made by entering the room.

	Average count
2½ min. exposure before lights	1,000+
5 min. exposure before lights	1,000+
Lights on 30 min.	
5 min. exposure after lights	6
30 min. exposure after lights	15
Control after lights	0
After above procedure plates exposed 15 min. longer with lights and fan on	8
Then plates exposed 15 min. more with lights and fan off	16

TABLE VI

Room exposed to lights 20 min. with and without the fan running.

	Average count	
	With fan	Without fan
2½ min. before exposure to lights	1,000+	1,000+
5 min. before exposure to lights	1,000+	1,000+
Lights on 20 min.		
5 min. after exposure to lights	10	6
30 min. after exposure to lights	30	50
Controls	0	0

TABLE VII

Room exposed to lights 30 min. with and without the fan running.

	Average count	
	With fan	Without fan
2½ min. before exposure to lights	500	1,000+
5 min. before exposure to lights	960	1,000+
Lights on 30 min.		
5 min. after exposure to lights	12	6
30 min. after exposure to lights	18	15
Control before lights	2	8
Control after lights	0	1

TABLE VIII

No lights were turned on in order to determine whether organisms had settled out in previous experiments resulting in the lowered counts.

	Average count
2½ min. exposure of plates	1,000+
5 min. exposure of plates	1,000+
Room allowed to stand quiescent 30 min.	
5 min. exposure of plates after room was queiscent	1,000+
30 min. exposure of plates after room was quiescent	1,000+

Research Finds Substitute For Bacteriological Agar

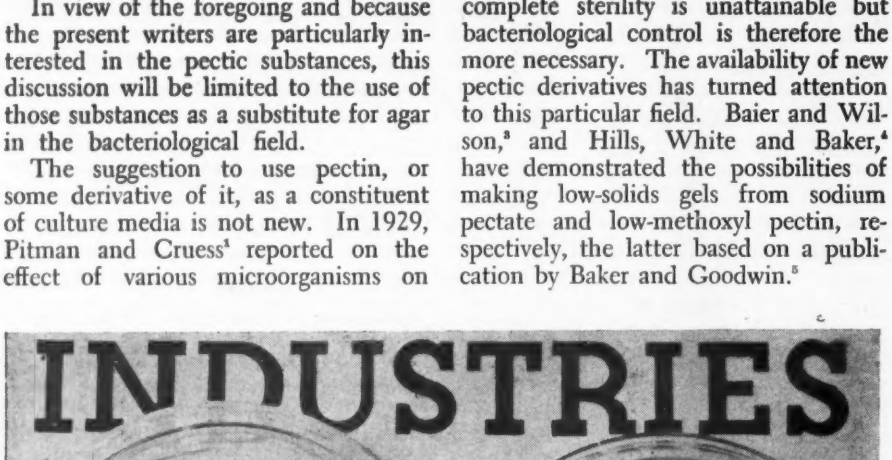
By W. E. BAIER and T. C. MANCHESTER
Research Department, California Fruit Growers Exchange, Ontario, Calif.

A shortage of agar has caused investigators to search for a substitute for bacteriological agar. As a result, a pectinous material, sodium ammonium pectate, has been used successfully in some of the most commonly employed solid media

CULTURE media for plates and slants, particularly counting plates considered here, demand a gel-producing constituent which meets very exacting specifications. Other gel materials have been suggested and some have been used in special applications, but agar has been and still remains the standard gel-forming agent for bacteriological culture media.

In view of the foregoing and because the present writers are particularly interested in the pectic substances, this discussion will be limited to the use of those substances as a substitute for agar in the bacteriological field.

The suggestion to use pectin, or some derivative of it, as a constituent of culture media is not new. In 1929, Pitman and Cruess[1] reported on the effect of various microorganisms on pectin in the sol form. More recently, Prickett and Miller[2] have used pectin sols in nutrient broths. The threatened shortage of agar, previously imported from Japan, together with increasing demands by food and beverage industries have encouraged intensive investigation. Foods formerly packaged and processed in hermetic containers are now undergoing modification for packaging where complete sterility is unattainable but bacteriological control is therefore the more necessary. The availability of new pectic derivatives has turned attention to this particular field. Baier and Wilson,[3] and Hills, White and Baker,[4] have demonstrated the possibilities of making low-solids gels from sodium pectate and low-methoxyl pectin, respectively, the latter based on a publication by Baker and Goodwin.[5]



Petri dishes containing the usual depth of solidified media (agar at left, pectate at right) both poured at 43 deg. C. (109 deg. F.), showing equal clarity.

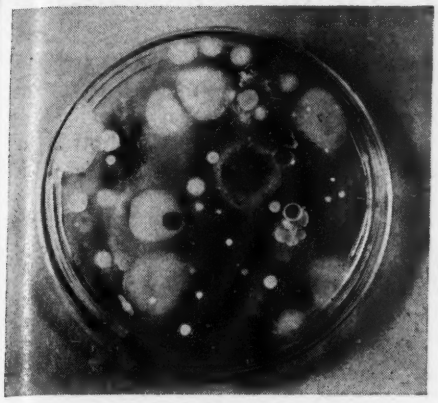
The capability of gel production at low solids does not, however, signify successful application to the bacteriologists' culture media for plate counts. The gel for this purpose must be heat reversible, nontoxic to the growth of organisms, it should not be liquefied by the organisms, it must withstand the usual autoclaving procedure, and it should remain sufficiently fluid for pouring at 43 deg. C. (109 deg. F.). Gelation should take place with moderate speed at room temperature, and the gel must withstand incubation up to 40 deg. C. (104 deg. F.) or higher without melting or slipping. Furthermore, the agent should be effective in amounts not excessive as compared with agar, compatible with the nutrients commonly incorporated in media and should be capable of use over the pH range of about 4.5 to 8.5.

Ordinary pectin, which forms highly desirable jellies with a sugar solids content of 60 percent and higher, is not suited for jelled bacteriological media. From pectin can be prepared pectic acid or the ordinary nonviscous sodium pectate, but gels of these derivatives do not have particularly good texture nor are they brilliantly clear, as is desirable for plate counts. The low-methoxyl pectin showed promise, but unfortunately did not have the ability successfully to undergo autoclaving under the conditions imposed. It is well suited, however, for food uses in place of agar.

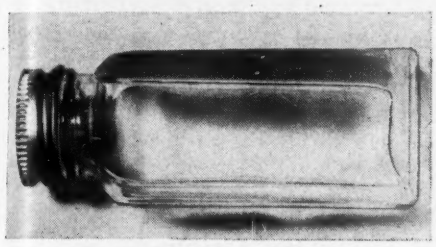
The viscous-type sodium pectate remained as the most promising pectic material for plate culture media. Early investigation indicated that sulphonation of the pectate improved its properties, but other improvements in technic subsequently overshadowed any possible benefits from the sulphonation treatment.

Materials Used

The sodium pectate employed was a commercially manufactured product actually containing about 1 percent ammonia as sodium ammonium pectate. It is the high-molecular-weight or viscous-type soluble pectate already described.[3] Food-grade sodium hex-



Pectate medium (Formula No. 1) exposed to the air after solidification, showing ready growth of various organisms.



"Hasson bottle" ready for use, containing slab of pectate culture medium (shown adhering to upper side of bottle).

ametaphosphate (Calgon) from Calgon, Inc., was used to sequester calcium, and McKesson's U.S.P. powdered gum acacia was used to aid in preventing slippage. Acacia was found the best of several substances tried, including pectin, starches, tragacanth, locust bean gum and dextrine. The use of acacia is, however, optional in that the formulas without this ingredient are usually found quite satisfactory for all ordinary work. Other bacteriological materials were Difco brand.

Formulas for Sodium Pectate Bacteriological Media

In each of three very commonly used formulas, we have successfully substituted sodium ammonium pectate for agar.

It has been necessary to use about twice as much pectate as agar, although the pectate requirement may be reduced if desired by increasing the available calcium. Our preferred formulas follow:

1. Standard Methods—Water and Sewage (A.P.H.A.)

NaOH (1N)	*8.0 ml.
Calgon (food grade)	2.5 g.
Beef extract	3.0 g.
Peptone	5.0 g.
Sodium ammonium pectate	30.0 g.
Acacia (optional)	(0.5 g.)
Water (distilled)	1,000.0 ml.

2. Standard Methods—Milk (A.P.H.A.)

NaOH (1N)	*8.0 ml.
Calgon (food grade)	2.5 g.
Beef extract	3.0 g.
Tryptone	5.0 g.
Glucose	1.0 g.
Sodium ammonium pectate	30.0 g.
Acacia (optional)	(0.5 g.)
Water (distilled)	900.0 ml.

Add 100-ml. of a sterile 10 percent solution of skim milk just prior to use.

3. Certified Milk (A.A.M.M.C. 1941)

NaOH (1N)	*9.0 ml.
Calgon (food grade)	2.5 g.
Beef extract	3.0 g.
Proteose-peptone	5.0 g.
Tryptone	5.0 g.
Sodium chloride (C.P.)	5.0 g.
Dextrose	1.0 g.
Sodium ammonium pectate	30.0 g.
Acacia (optional)	(0.5 g.)
Water (distilled)	1,000.0 ml.

*Add sufficient NaOH to give an initial pH of 7.7 ± 0.1. When sterilized at 15 lb. pressure for 15 to 20 minutes, a pH of about 6.6 will result.

The fourth is a somewhat less commonly used formula:

4. Potato-Pectate

NaOH (1N)	**6.0 ml.
Calgon (food grade)	2.5 g.
Dextrose	20.0 g.
Sodium ammonium pectate	30.0 g.
Acacia (optional)	(0.5 g.)
Potato water	1,000.0 ml.

**Add sufficient NaOH to give an initial pH of 7.0 ± 0.1. When sterilized at 15 lb. pressure for 15 to 20 minutes, a pH of about 6.2 will result.

Preparation

Formula 1—Add the NaOH to the cold water in a 2-liter beaker and then add and dissolve the Calgon. Stir in the beef extract and peptone, and weigh. While heating this solution on the steam bath, weigh and mix the dry pectate and acacia (if used) and add to the solution with constant stirring to avoid lumps. Continue heating at 85 deg. C. (185 deg. F.) or higher for 15 minutes with occasional stirring. Determine and adjust pH (7.7 ± 0.1) while further raising temperature; finally stir and heat to boiling over a wire gauze and low flame. Boil five minutes to expel air which would otherwise cause foaming during sterilization. Adjust weight with distilled water, heat again to boiling and pass through four thicknesses of cheese cloth or through absorbent cotton and fill into flasks, tubes or Hasson bottles described later in this article. Sterilize at 15 lb. pressure for 15 to 20 minutes. The sterile medium may be used at once or it may be stored for use in some future time.

Formula 2—In the preparation of this medium the same general procedure is followed as with Formula 1, the beef extract, tryptone and glucose replacing the beef extract and peptone of that formula. To allow for a total addition of 100 ml. of 10 percent sterile skim milk, 900 ml. of water is used. Ordinarily, 270-ml. portions of the original mix are added to flasks before sterilization. This allows for the addition of 30 ml. of the skim milk solution to each flask just before use. The skim milk solution is added to the hot mix with careful agitation to insure a uniform mixture.

Formula 3—Here again the same general procedure is followed as with Formula 1, the beef extract, proteose-peptone, tryptone, sodium chloride and dextrose replacing the beef extract and peptone of that formula.

Formula 4—Peel and slice 200 g. of potatoes, add 1,000 ml. of distilled water and boil gently for one hour. Strain through a cheesecloth and absorbent cotton pad. Make the potato water back to 1,000 ml. with distilled water. Transfer to a 2-liter beaker, add the 1N NaOH, add the Calgon, weigh, heat to 85 deg. C. (185 deg. F.) and add the dextrose. From this point follow the procedure of Formula 1.

Properties and Use

The media as above prepared will be found to produce fairly firm gels with good tenacity. They will stand incubation at temperatures up to 40 deg. C. (104 deg. F.). Some molds cause considerable liquefaction. Also, a few bacteria have been observed to cause liquefaction. Generally speaking, about the same counts have been obtained as with a corresponding agar medium. These gels are slow setting as compared to agar gels. Therefore, plates should be allowed to set for 30 minutes to 2 hours or longer, depending on the particular medium employed, before being inverted and placed into the incubator. Factors such as calcium or magnesium, pH and concentration of pectate control setting time. Unfortunately, decreased time of set has been generally associated with increased pouring temperature. Limited available data indicate that plate counts may be made after a somewhat shorter incubation time than with agar plates.

Solidified stock medium may be remelted for use like agar except that higher temperature is required. Autoclaving tubes or flasks at 5 lb. pressure for 10 or 15 minutes is recommended. For quantities larger than 100 ml., it is necessary to use 10 lb. pressure for the same period.

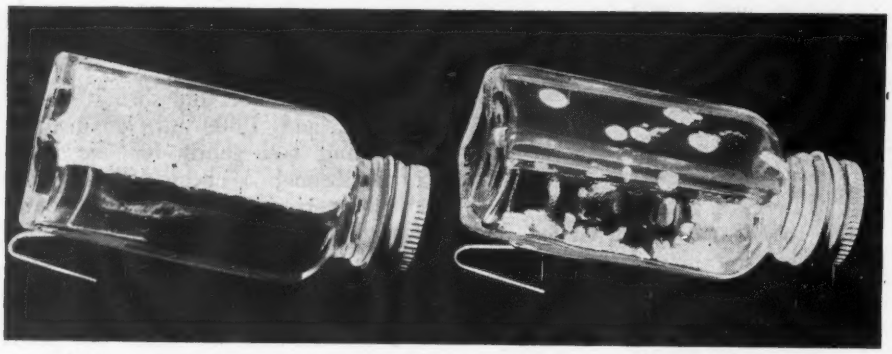
Limitations

So far we have been able to prepare pectate gels which have the required heat reversibility only within a rather narrow pH range. Fortunately, these gels have the very favorable pH of about 6.5 where most organisms found in milk, water and sewage thrive.

The liquefaction observed is not ordinarily of serious proportions, but should not be ignored as it could be of importance in some instances.

While these media are heat reversible, they are not as fluid as the corresponding agar media. Therefore, they require somewhat more care in mixing with the inoculum in the pouring of plates.

In some fields of work, particularly in emergencies, and also where routine counts are to be made, the Hasson method gives much promise of being able to fill a real need, but it must be considered as qualitative or, at best, roughly quantitative. We have found the pectate media thus far developed to be well suited to Hasson's procedure. Since the medium is sterilized in the same bottles in which the counts are to be made, any pouring or mixing difficulties are avoided. This allows for the use of pectate media with a pH considerably lower than it would be possible to use with the regular plate method, and utility of the pectate media is very greatly increased.



Bottles of pectate medium, surface inoculated in duplicate. The spreaders covering the medium in bottle at left have been greatly retarded by diphenyl crystals on bottom side of bottle at right.

Since any considerable amount of calcium or magnesium ions cause presetting of the pectate gel, these media are not satisfactory for plates where undiluted milk is used as inoculum, but 1/10 dilution may be used. If it is necessary to plate straight milk, 5 mg. of Calgon in sterile solution is first added to the inoculum.

Possible Applications

Many fields which appear to offer promise are yet to be investigated. It is thought that in some of these there will remain a real need for pectate media after the present agar shortage has ended. Future work may demonstrate that pectate media will be useful for purposes of differentiation, particularly with reference to molds and bacteria.

The method of counting proposed by Hasson[6] is being investigated. A sufficient quantity of medium is autoclaved in a loosely capped square bottle to form a flat ¼-in. slab when laid on its side to cool. The liquid inoculum is introduced, thoroughly flowed over the surface, drained, and the bottle tightly recapped. The bottle is inclined slab up, cap down during incubation.

Where the presence of molds is not of particular significance, but where mold colonies interfere with or obscure the colonies of other organisms, mold-growth control should be of real value as proposed by Hertz and Levine.[7] They incorporate diphenyl or sodium propionate as a fungistatic agent in the culture medium itself. Such control would be particularly important in connection with pectate media because of the ability of molds to liquefy such media.

An attractive possibility is the introduction of the volatile diphenyl as vapor at the surface of the medium instead of dissolving it, as did Hertz and Levine. Subsequent to draining the Hasson bottles after surface inoculation, diphenyl crystals are inserted in sufficient quantity to maintain the surface fungistatic during the remaining incubation.

For this purpose some definite amount (by weight, measure or count) of crystals should be distributed over the bottom side of the bottle in its inclined position. In preliminary trials, this system allowed nearly normal "counts" of yeasts and the ordinarily numerable bacteria, but inhibited both molds and the spreaders which Hasson found troublesome. It was found desirable to incubate for perhaps 2 or 3 hours or more before introducing the diphenyl. The above method offers the additional advantage that a single stock of tightly capped culture bottles of sterile medium will serve either Hasson's original purpose or this modification of Hertz-Levine's procedure.

In our work, 2-oz., continuous-thread, 25-mm. finish, square bottles each contained 10-c.c. slabs of pectate media, potato-pectate (No. 4) being particularly suitable. The surface was inoculated with 1 ml. of mixed cultures.

In the present emergency, a combination of pectate media, the Hasson method of making counts, and the Hertz and Levine method of mold control, as well as the independent use of each, should receive the serious consideration of bacteriologists. It is our hope that others will contribute by working out other uses for pectate media and making them available.

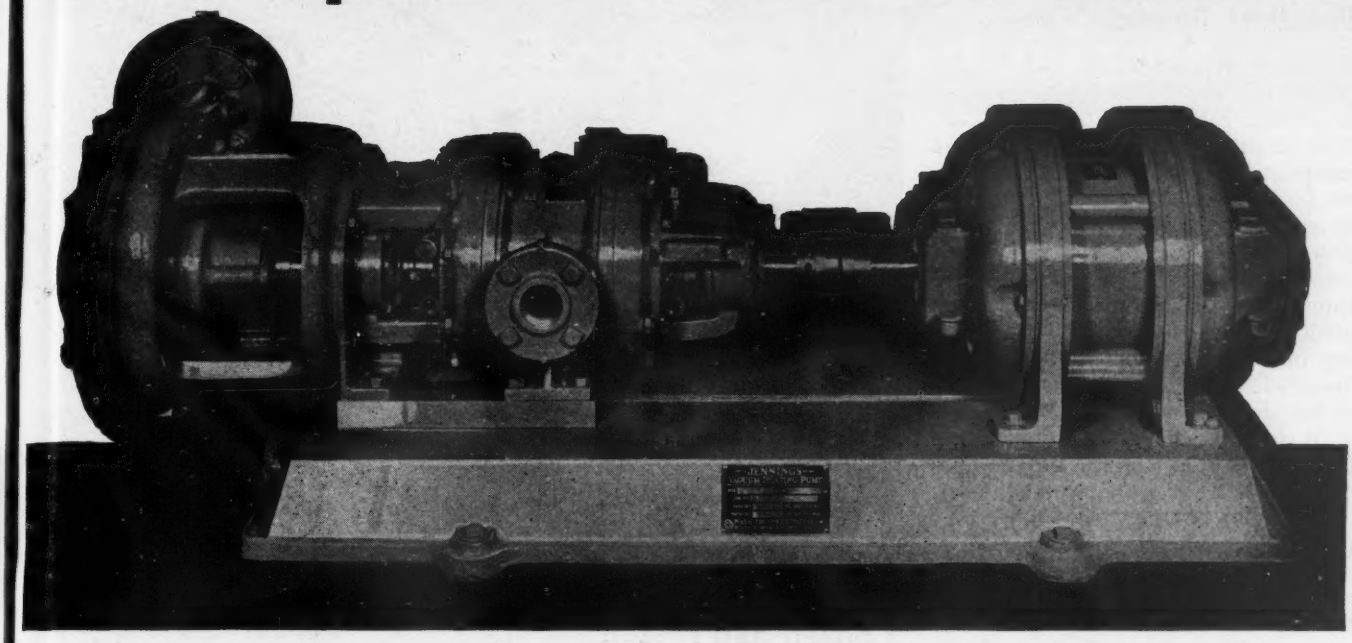
We gratefully acknowledge the many suggestions from Dr. E. F. Bryant, R. E. Cox, J. W. Stevens and C. W. Wilson of this Department, and also the help of Dr. R. V. Stone and Ellen K. Riess of the Los Angeles County Health Department.

It should be stated that Dr. W. D. Maclay and associates of the Western Regional Research Laboratory, U. S. Department of Agriculture, Albany, Calif., have quite independently investigated this subject, and their results are discussed in an article entitled, "The Use of Fibrous Sodium Pectate as a Substitute for Agar in Bacteriological Gels," in *Science* for May 7, 1943.

References

1. G. A. Pitman and W. V. Cruess, Hydrolysis of Pectin by Various Microorganisms, *Industrial and Engineering Chemistry*, vol. 21, 1292-1295, 1929.
2. P. S. Prickett and N. J. Miller, Effect of Pectin on Bacterial Growth, *Proceedings of the Society for Experimental Biology and Medicine*, vol. 40, 27-28, 1939.
3. W. E. Baier and C. W. Wilson, Citrus Pectates—Properties, Manufacture and Use, *Industrial and Engineering Chemistry*, vol. 33, 287-291, 1941.
4. C. H. Hills, J. W. White, Jr., and G. L. Baker, Low-Sugar Jellying Pectinates, 1942 *Proceedings of the Institute of Food Technologists*, 47-58.
5. G. L. Baker and M. W. Goodwin, Demethylated Pectins Offer Advantage in Low-Sugar Jellies, *Food Industries*, vol. 14, 53, 99, September, 1942.
6. R. Hasson, An Emergency Method for Estimating Bacterial Populations. *Journal of Milk Technology*, vol. 5, 243-245, 1942. See also R. V. Stone, Laboratory Control of Milk Under War Conditions, *American Journal of Public Health*, vol. 33, 399-400. April, 1943.
7. M. R. Hertz and M. Levine, A Fungistatic Medium for Enumeration of Yeasts, *Food Research*, vol. 7, 430-441, 1942.

Nash—the Perfected Vacuum Pump for Evaporators and Condensers

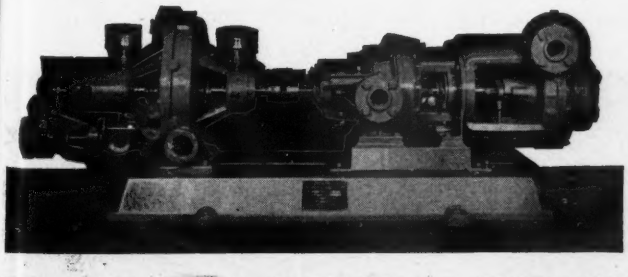


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

SOUTH NORWALK · CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

Two-Part Plastic Cap

THERE is apparently no end to the varieties of closures now being developed to replace metal caps. One of the most recent substitutes is the two-part semiplastic cap manufactured by Closure Corp., New York, now under test by several leading food companies. The closure, which uses a relatively small amount of Bakelite, is made of an annular plastic retaining ring which holds a heavy paperboard liner to the top or mouth of the glass container. Since the liner serves also as the top of the closure, acting as a closing disk, it is heavier than the conventional liner. The top surface of the disk can be used either for printed matter or for color contrast with the plastic ring or the container itself.

The closure can be made in the screw type for containers with a CT finish, the snap-on type for containers with a bead finish, and the slip-on or friction-fit type for containers with a plain tapered finish. The retaining rings are molded concentrically in "cone" form, which makes possible the molding of as many as ten rings of different sizes in the same cavity, resulting in a saving of steel, machine time and labor, as well as plastic.

Pre-Cooked Soy Flour

P. D. RIDENOUR Co., Chicago, is now marketing what is reputedly the first 1-lb. consumer size package of specially processed soy flour to be nationally offered through retail channels. "Little Major" soy flour is a highly concentrated vegetable protein food for use in general cooking to add richness of flavor, color and nutritional value.

Cooked and Frozen

FAINER FROZEN FOODS, Pasadena, Calif., recently introduced an institutional pack of precooked quick frozen chili beans. For a package the company selected a leakproof cellophane bag made by Dobeckmun Co. The cooked chili beans are packed into these bags, which are heat sealed, then placed in rectangular forms for freezing. Three 11-16 lb. bricks are packed per carton for the institutional trade.

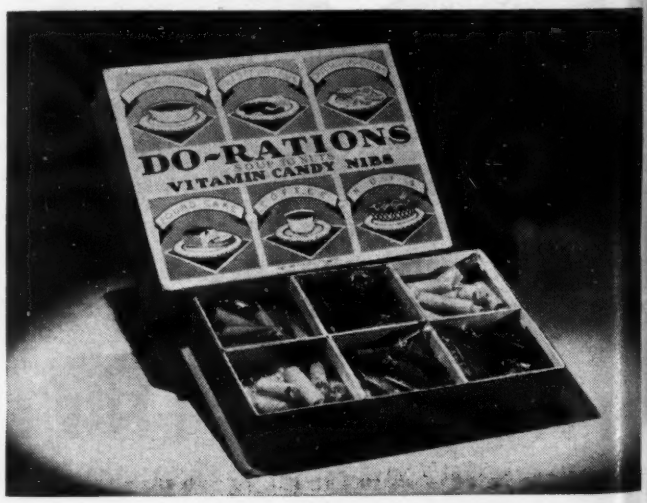
A Sweet Little Meal

THE last word in concentrated foods—candy with the flavor and nutrient value of an entire meal—has been introduced by Joe Franklin Myers Industries, Dallas, Tex.

"Do-Rations," vitamin-candy nibs, are packed in six compartments of a 14-oz. package. Included in the package are cellophane-wrapped candies with pea soup, frankfurter, cheese and cracker, pound cake, coffee and nut flavors. How they are made is a trade secret, but ingredients include glucose, dextrose, sugar, pecans, coffee, true and imitation flavors, cheese, vitamins A, B_1, B_2, B_6 and C niacin, pantothenic acid, calcium, iron and U. S. certified colors.

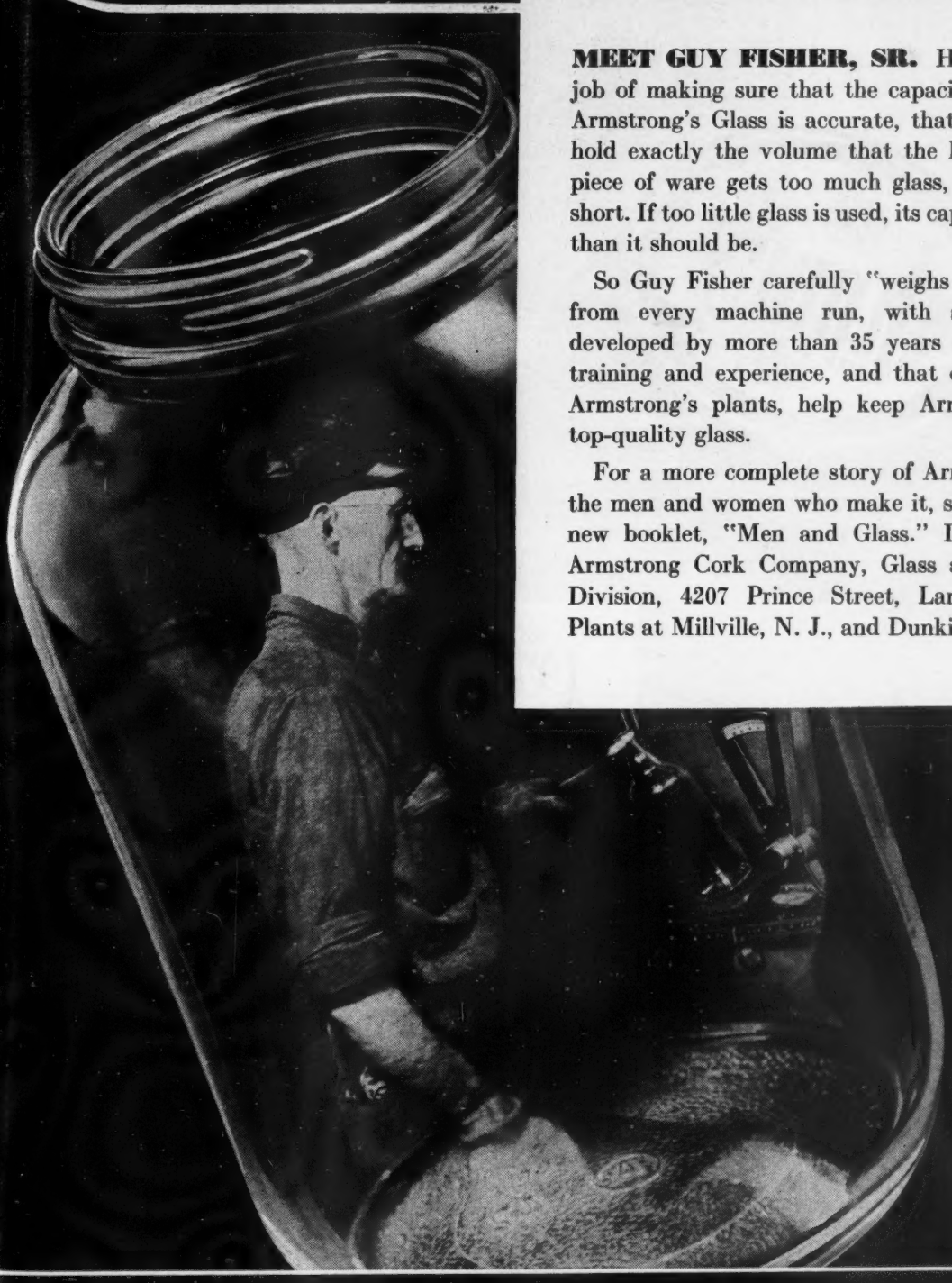
"Calumet" in Fiber Cans

"Calumet" baking powder, well-known General Foods' product, is now packaged in a wartime all-fiber lap-seam can, manufactured by American Can Co. The can, made in 5-lb. and 10-lb. sizes, has a reclosure top, used to protect the baking powder after an opening is cut in the semicircular scoring in the permanent top of the can.



A QUART IS ALWAYS 32 OUNCES

. . . when glass craftsmen check capacity

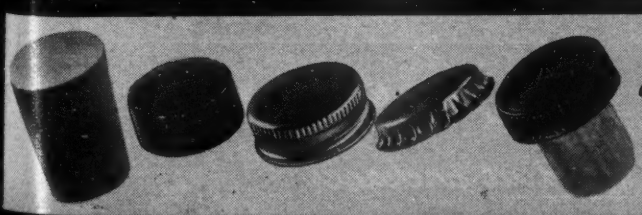


MEET GUY FISHER, SR. His is the important job of making sure that the capacity of every piece of Armstrong's Glass is accurate, that each container will hold exactly the volume that the buyer specified. If a piece of ware gets too much glass, its capacity will be short. If too little glass is used, its capacity will be greater than it should be.

So Guy Fisher carefully "weighs in" bottles selected from every machine run, with skill and certainty developed by more than 35 years of glassmaking. His training and experience, and that of his co-workers in Armstrong's plants, help keep Armstrong's Glass the top-quality glass.

For a more complete story of Armstrong's Glass and the men and women who make it, send for Armstrong's new booklet, "Men and Glass." It's free. Just write Armstrong Cork Company, Glass and Closure Division, 4207 Prince Street, Lancaster, Pa. Plants at Millville, N. J., and Dunkirk, Indiana.

ARMSTRONG'S GLASS



and **ARMSTRONG'S CLOSURES**

A bright spot...

in today's packaging picture

DESPITE WARTIME STANDARDIZATION of glass containers, you can still have packages that are colorful and distinctive . . . packages that will stand out in mass display.

This extra sales-appeal—plus low-cost, dependable sealing—is yours when you use lithographed Armstrong's Metal Caps.

Your name or trade-mark, boldly displayed in color on these caps, helps customers find your package. It helps them remember it, too, because they get a fresh reminder every time they open and reopen the container.

We'll be glad to show you how lithographed Armstrong's Metal Caps will add eye-appeal to your wartime package. Just send us a sample of your present package. We'll return it promptly with our suggestion for a cap design.

And if you have any other wartime glass packaging problems, let us know about them, too. We're constantly seeking new ways to overcome today's difficulties, and we may be able to help. Armstrong Cork Company, Glass and Closure Division, 4207 Prince Street, Lancaster, Pennsylvania.

ARMSTRONG CORK COMPANY

ARMY E NAVY

The Army-Navy "E" Flag flies over Armstrong's Lancaster Closure and Floor Division Plants, awarded for excellence in the production of cartridge cases, shells, aircraft parts, camouflage, and hundreds of other vital materials for war and for victory.

ARMSTRONG'S CLOSURES

Turn standard containers into standout packages

Calumet's new package is said to ship well and provide a satisfactory shelf life, though not as great as that of metal cans. Before the war, several baking powder manufacturers made their own all-metal cans, but with the emergency restrictions on metal and equipment, they have discontinued the practice. Spokesmen for the can manufacturing industry expect a large postwar volume in the new all-fiber can field.

All-Purpose Stabilizer

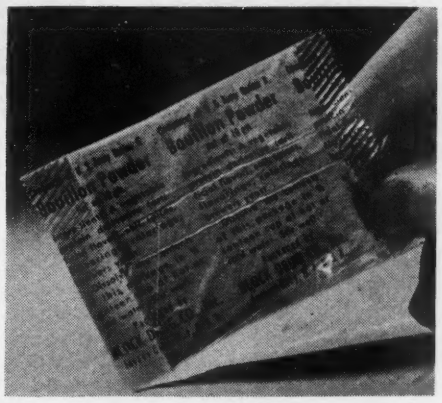
ICE CREAM, puddings, pie fillings, meringues and icings benefit from the addition of "Mell-O-Whip," a food stabilizer packed by National Food Products, Chicago, Ill. It can also be used as a butter extender, according to its makers. Made of processed vegetable gum powder, processed cereal and vegetable products, the thickening agent jells in water and liquids, and helps to hold moisture in suspension in food products.

Bottled Vanilla Bean

In the old country and in some Greenwich Village shops today, fragrant vanilla beans are suspended on long hooks behind the food counters. Twin Trees Gardens, Lynbrook, N. Y., has modernized the practice of using vanilla beans, preferred by some cooks to the flavoring extract, by bottling each selected separate bean in a glass jar with an enameled screw top.

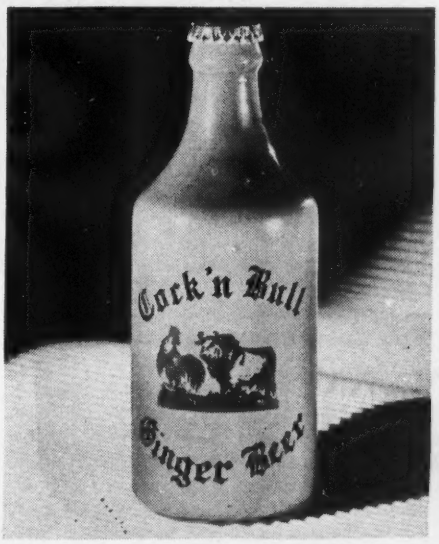
Bouillon in Cellophane

BOUILLON powder, a component of Army emergency ration K, is packaged by Block Drug Co., Inc., Jersey City, N. J., in heavy laminated cellophane envelopes, with a net weight of 10 grams. The use of this wax-coated laminated cellophane has greatly increased during the last year of experimenting to find the best wrapper for Army foods, which must be moisture-vaporproof, insect proof and airtight.



Looks Like Stoneware

QUALITY packages continue to be manufactured—and to win attention over less spectacular designs. "Cock'n Bull" ginger beer, manufactured by Cock 'n Bull Products, Inc., Hollywood, Calif., is bottled in what appears to be an old English stoneware crock, with the trade name in English script. Actually, the package is an ordinary glass bottle sprayed with brown paint for the neck, white for the base, and baked.



an integrated
PACKAGING
Service

Your nearest Rossotti Packaging Man will consider it a privilege to demonstrate how the Rossotti organization can equip your products—or group of products – with it's most salable dress. Or write us at North Bergen direct for constructive, hard-hitting packaging counsel. No obligation, of course.

Rossotti
LITHOGRAPHING COMPANY, INC.
NORTH BERGEN, N. J.
SALES OFFICES IN PRINCIPAL CITIES

CAN-OPENER ...ARMY STYLE!

Maybe it isn't regulation . . . but there's been many a can opened in an Army kitchen with one quick swipe of a cleaver...just as a bayonet has always been the favorite can opener of men in the field.

But the end of the line is not the only place where containers carrying food for our fighting men get rough treatment. Crown Cans have proved their ability to take it in the holds of cargo ships . . . on primitive railroads . . . and jouncing around in motor transport over roads that have no right to the name!

A very large proportion of Crown's production now goes to the armed forces... to carry the food to feed our own men and our Allies. And from every theatre of operations in this global war comes the report that Crown Cans are doing their duty... protecting and preserving food for fighting men all the way to the front lines.

CROWN CAN COMPANY, New York • Philadelphia, Pa., *Division of Crown Cork and Seal Company,* Baltimore, Md.

CROWN CAN ★ ★ ★

FOOD INDUSTRY NEWS

GENERAL NEWS • TRENDS • MEN • JOBS • COMPANIES • JULY, 1943

Sales of Food Machinery Geared to War Needs

Production and distribution of both new and used equipment brought under control by L-292

Food processing machinery when it is needed and where it is needed is theoretically assured by Limitation Order L-292. The announcement that the production and distribution of both new and used equipment was under complete control was evidence that M. Lee Marshall had started the job he had been appointed to handle by War Food Administrator Chester Davis. The new order permits the War Production Board to integrate the manufacture and sale of food processing machinery with the food program as it is set up by the War Food Administration.

The order covers processing machinery for food, tobacco and beverages. Under its terms at any time schedules may be adopted that specify the exact number of machines that can be made. In the event that no schedules are adopted, the rate of production for the first 10 months of this year is to be the same as for the similar period of 1942. If no schedule has been set up by the end of September, the rate of production for the next fiscal year is fixed at 50 percent of the average of the years 1939, 1940 and 1941. This might be inferred to be an inducement for WFA to get a food program laid out quickly.

After June 15, 1943, purchase orders may not be accepted by any manufacturer, dealer or processor, and on or after June 30, 1943, no machinery may be delivered or accepted, unless:

1. It bears a preference rating of AA-3 or higher obtained under Limitation Order L-41 (construction) assigned on Form WPB-617 (formerly PD-200).
2. It is for canning machinery or equipment listed in Schedule A of the order, to be delivered to a processor located within the territorial limits of the United States and Canada and bears a preference rating of AA-3 or higher assigned on Form WPB-576 (formerly PD-285), or for dairy, egg or poultry processing machinery or equipment listed in Schedule A, bearing a preference rating of AA-3 or higher assigned on Form WPB-748 (formerly PD-414).
3. It is a purchase order received by a manufacturer or dealer prior to June 5, 1943, for items to be delivered on or after June 30, 1943, and has been approved by the War Production Board, or a purchase order bearing a rating of AA-3 or higher assigned on Form PD-1A.

These restrictions apply to new food processing machinery with a value of over $50 and used, reconditioned or rebuilt food processing machinery having a value of over $300.

Ratings for canning machinery and equipment may continue to be obtained under Priority Order P-115, and ratings for dairy processing machinery and equipment under Priority Order P-118.

The present order, therefore, supersedes L-83 insofar as food processing machinery and equipment is concerned.

Bill Would Strip OPA Of Control of Food

Although OPA has been going through the most critical period of its existence, its final dismemberment is not in sight. But all food control functions may eventually be transferred to the War Food Administration. Republican members of the House have pushed this idea as have the farmers organizations, and also food processors. A bill which would transfer the powers of food rationing and pricing now enjoyed by the OPA to the WFA, and also provide for central responsibility for production and distribution in the hands of the War Food Administrator, was started through the political mill on June 1. This bill (H.R. 2837) is expected to include, by the time it comes out of the Committee on Agriculture in the House, the provisions which will give to the War Food Administrator "the powers that he should and must have" to function properly in the present crisis. Congressman H. F. Fulmer is the sponsor of the bill.

Sugar Allocations

Allocation of the expected 1943 sugar supplies was announced on May 22, followed by a War Food Administration statement that, on the basis of prospective 1943 supplies of sugar, the current level of consumption in this country probably can be maintained. WFA announced allocation of the prospective supply as follows: 1,153,000 tons for the armed forces and Lend-Lease and other exports, and 4,600,000 tons for civilian uses. Civilian uses include an estimated 2,258,000 tons for household use and home canning, and 2,342,000 tons for industrial and institutional sugar users.

ASK PRESIDENT FOR FOOD CZAR

Members of the House Agricultural Committee said, after conferring with President Roosevelt on June 15, that Congress apparently would have to enact legislation to provide for an all-powerful food administrator. Shown here as they were leaving the White House, the group include (left to right) August H. Andersen, Minnesota, John W. Flannagan, Jr., Virginia; Clifford R. Hope, Kansas; Hampton F. Fulmer, South Carolina; Richard M. Kleberg, Texas; and Harold D. Cooley, North Carolina.

MRO Supplies Put Under CMP

Amount of maintenance, repair, operating supplies limited to fourth of 1942 purchases

Food processors now get their maintenance, repair and operating supplies under the terms of CMP Regulation No. 5. Recent amendments to orders P-115 and P-118 remove provisions which automatically assigned high preference ratings for purchase of MRO in favor of equally high ratings assigned by Regulation 5. The changeover actually makes no change in general procedure. But the quantity restrictions of Regulation 5 govern and limit the amount of supplies that may be obtained during any calendar quarter to one-fourth of the amount purchased during the calendar year 1942.

Provision is made for seasonal businesses permitting the purchase of maintenance, repair and operating supplies in an amount equal to the entire calendar year of 1942 or to the amount purchased during the corresponding quarter of 1942.

Regulation 5 permits minor items of capital equipment not exceeding $500 in value to be purchased as maintenance, repair and operating supplies. Processors are warned against making free use of this provision. The $500 must be taken from their annual quota and may so reduce the amount remaining as to hinder seriously later operations. Government officials point out that an AA-3 rating is available for replacement items. Use of the AA-3 rating requires specific authorization from WPB. Processors operating under Order P-115 make application on form PD-285 and processors operating under P-118 use form PD-414.

In addition to using the AA-3 rating for replacement, it may be used for securing material required for more efficient operation.

Recent amendments and interpretations of CMP Regulation No. 5 permit the use of ratings assigned under the order to obtain MRP items for general offices, branch offices, sales rooms and other facilities essential to the conduct of the business.

On the other hand, automotive replacement parts and maintenance equipment have been removed from the list of items that may be purchased under ratings assigned by Regulation 5. Another recent interpretation of the regulation excludes the distribution of food products from the list of industries eligible for the use of the AA-1 rating for MRO items.

Persons engaged in selling food products are entitled to use the AA-5 rating assigned to industries not listed in the Regulation.

Present Food Policies Defended by Roosevelt

Two important changes in the handling of the wartime food economy which are strongly favored by the food industry apparently have run up against strong opposition in the White House. President Roosevelt, on June 15, called absurd the suggestion that one man be given full authority over food, and he also expressed himself as strongly in favor of the roll backs in prices of beef, butter and coffee through the use of subsidies.

He challenged opponents of subsidies to produce a better plan. He stated that even if such a plan costs $1,500,000,000 or $2,000,000,000 annually, the amount would be only 1½ or 2 percent of the $100,000,000,000 national budget.

ELECTED BY CEREAL CHEMISTS

Here are the officers elected at the recent annual meeting of the American Association of Cereal Chemists. Left to right: Lowell Armstrong, Ballard & Ballard Co., Louisville, Ky., secretary; Perie Rumold, Standard Milling Co., Kansas City, Kan., treasurer; Dr. Betty Sullivan, Russell-Miller Milling Co., Minneapolis, Minn., president; Dr. Oscar Skovholt, Quality Bakers of America, New York, N. Y., vice-president; and Dr. William F. Geddes, University of Minnesota, Minneapolis, Minn., editor of "Cereal Chemistry."

United Nations Set Food Goals

Delegates plan expansion in food production to attain freedom from want in world

While no concrete action was taken, nor was possible, at the recent United Nations Food Conference in Hot Springs, Va., agreement was reached as to what should be done to abolish hunger. And if the plans eventually are carried out, they will change the food economy of the entire world.

The Conference recognized that a great increase would be needed in the production of food if progress was to be made towards freedom from want. The immediate need is for increase in the production of cereals and other foods which maintain human energy at satisfactory levels. In the long-range program, however, it would be necessary to place emphasis on the production of foods containing first-class protein and other protective qualities necessary to good health.

Production is only one part of the battle, and the delegates to the conference agreed that freedom from want cannot be achieved unless there is a balanced and world-wide expansion of economic activity which will provide the people with purchasing power to obtain the necessary amounts of food. Poverty was recognized as the No. 1 cause of malnutrition and hunger.

The delegates discussed various methods of attaining their freedom from want goals and agreed that the nations represented at the conference should establish a permanent organization in the field of food and agriculture. In the meantime, the conference recommend the establishment in Washington of an interim commission, one of the functions of which would be to draw up for submission to governments and authorities represented a detailed plan for the permanent organization.

GMA Requests Changes In U.S. Food Policies

Seriously concerned over the food situation in the United States, Grocery Manufacturers of America, at its meeting last month in New York, drew up a declaration of principles with respect to the war food policy of the United States government. Outstanding among the principles is the recommendation that the government should consolidate all its authority over the production and distribution of food in the War Food Administrator.

GMA also declared that the govern-

JOHN T. McCARTHY

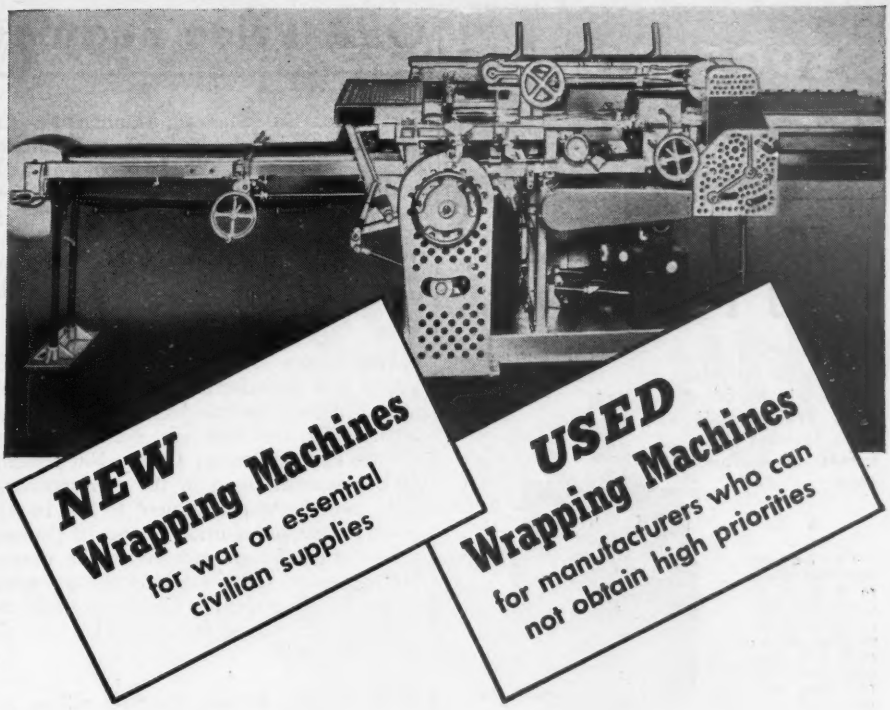
Newly elected president of American Bakers' Association is John T. McCarthy, president of Jersey Bread Co., Toledo, Ohio, and of Sandusky Baking Co., Sandusky, Ohio, and former Chief of the Bakery Products Section, WPB. Mr. McCarthy will devote most of his time to the Association's Washington office, replacing Ralph D. Ward who has become chairman of the Board of Governors of ABA.

ment should not use the subsidy means of food price control, but should employ price ceilings on basic foods, these ceilings applying only to the original sale of such foods, resale being regulated on a fair mark-up basis. Further, control should be established for every element which enters into the cost of food production and distribution.

The grocery manufacturers recommended that the government ration only basic foods, and also that it declare the production, processing and distribution of food and all supplies necessary for this production and distribution, essential activities.

Bread Order Changed

FURTHER CHANGES in the bread order were announced on June 18, in an amendment which tightened restrictions against consignment selling of bakery products, removed minimum milk requirements in white pan bread formulas, set higher maximums for sugars and shortening. Under terms of amendment 4, FDO 1, enrichment of white bread is still required, although the provision under which bakers were required to use a minimum of 3 parts of milk solids or skim milk in each 100 parts of flour in white pan bread formulas was removed. Restrictions concerning wrappings were modified.



We can serve you either way

Because we are at present re-tooling for additional war work, our production has been so arranged that we can build a certain number of new wrapping machines *without* interfering with our armament work. So if you need an additional machine for essential supplies, don't fail to consult us . . . We'll be glad to give you helpful information about obtaining the necessary priorities.

If you can't obtain a sufficiently high priority, or haven't time to wait for a new machine, our Wrapping Machine Procurement Service will endeavor to put you in touch with a manufacturer who can *sell or lease* you a used machine of the right type. We have made a careful survey of the machines available and have on file the names of owners, model numbers and the kind of wrapping the machines can produce. In making use of this service, you are not restricted to wrapping machines now used in your field, for practically all of our machines are readily adaptable to different forms of wrapping.

Put your problem up to our nearest office

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS
NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

EDGE MOOR
"Stainless"
EQUIPMENT FOR
FOOD PROCESSING

Our standard designs may meet your needs, thus saving valuable time and placing responsibility on Edge Moor Process Engineers to meet guarantees of performance.

Jacketed emulsifier built to A. S. M. E. Code for high pressure steam heating. Equipped with Turbine and Stator type stirrer.

"To Your Specifications"

Edge Moor "Stainless" steel mixing and processing equipment can be produced to meet the strictest specifications in rapid time, under a guarantee of satisfactory workmanship and performance.

One of a series of belt driven agitator mixers, 8' Dia. equipped with stay-bolted jacket for 100# W. P. Jacket covers, sides and flat bottom. Heavy duty stirrer constructed of steel. Originally built to handle malt syrups.

Write for Bulletin 115

• EDGE MOOR PRODUCES •

MIXING MACHINERY
COOKING KETTLES — STILLS
ROTARY DRUM DRYERS
HOLDING TANKS — HEATERS
EVAPORATORS — COOKERS
RENDERING EQUIPMENT

EDGE MOOR
IRON WORKS, INC.
EDGE MOOR, DELAWARE
30 ROCKEFELLER PLAZA
NEW YORK, N. Y.

OPA Price Regulations

Beef Used in Sausage Manufacture—As part of a three-point program to facilitate price control for frankfurters, bologna and fresh and smoked sausage, OPA on May 24 rolled back the price of some of the beef ingredients used in sausage manufacture. The roll-back, ranging from ⅜ cent to 1½ cents per pound, was effected through amendment 13 to Revised MPR 169.

Baking Mixes—OPA on May 27 provided bakers and manufacturers of baking mixes with a method for bringing their allotments of rationed fats and oils during the six months ending October 1 up to 100 percent of the amounts used in the corresponding 1942 period. An amendment to RO 16 announces that, in addition to the 70 percent ration originally granted under the meats-fats program, OPA would make an extra ration of 30 percent available to these industrial users during the April-May-June allotment period.

Flour Milling—Because the flour milling industry at this time of the year is processing wheat which originated some months earlier, the freight charges on which are not affected by the May 15, 1942, reduction, OPA on June 4 permitted the millers to continue using the rates in effect prior to May 15 in computing their maximum prices. The amendment 4 to MPR 296, which will delay reduction in maximum flour prices until the mills have used up a portion of their old transit billing, expires on Aug. 1, 1943, for some millers and on Sept. 1, 1943, for others, depending on geographical location.

Butter Roll-Back—The 5-to-6-cents-a-pound roll-back of retail butter prices went into effect throughout the country, with no loss of income to dairy farmer, creamery or distributor, on June 10 in amendment 15 to MPR 289 and amendment 3 to revised MPR 268.

The reduction in butter price, first of the announced roll-backs to be put into effect by OPA, was made possible by a 5-cent-a-pound subsidy to the creameries. In no case can the reduction at retail amount to less than 5 cents a pound. The average will be about 5½ cents-per-pound, a 10 percent reduction under the nation-wide average price of 55 cents a pound.

Research Laboratories—Food research laboratories and others who require coffee or sugar for experimental, teaching or other similar purposes may apply for allotments as industrial users, according to amendment 64 to RO 3 on sugar, and amendment 38 to RO 12 on coffee, effective June 5. Similar provisions already have been made for obtaining processed foods.

Nine Foods Removed From Control—Nine foods recently placed under fixed margin price control at the wholesale and retail levels were removed on June 9 from the lists of commodities contained in regulations under which they had been priced previously. The technical action, amendment 9 to MPR 255, now prices the nine foods under MPR 237 and 238. Included in the action are canned fruits, berries and juices; quick frozen fruits, berries and vegetables; apple butter; canned apples; applesauce; apple juice; fountain fruits; canned prune juice, canned dried prunes, canned prune concentrate and all other canned dried prune products.

"Tin-to-Glass" Formula—The "tin-to-glass" formula under which processors figure their prices when changing from tin containers to glass was made applicable on June 14 to processors of malted milk powder. The changeover in this field from tin to glass should mean no general increase in prices at retail in view of the $4,000,000 roll-back in wide-mouth glass container maximum prices which was announced recently by OPA. The formula provides a method whereby packers who now use different size containers may calculate their maximum prices for such new sizes. The formula now is put into effect for the processors of malted milk powder through amendment 26 to MPR 280.

Dressed Hogs, Pork Cuts—OPA on June 1 amended the regulation (RMPR 148) controlling maximum prices of dressed hogs and wholesale pork cuts, to take into account the general downward revision of freight rates as of May 15, 1943, and in four other respects. Maximum prices for dressed hogs and wholesale pork cuts outside of the central price zone, the area of greatest production, and the Chicago price zone, which includes about 20 percent of the country's slaughter of hogs, are based on a freight differential of 115 percent of the carload freight rate from designated basing points, the total then being rounded to the nearest 25 cents.

Beef, Veal, Lamb, Mutton, Pork—Specific dollars-and-cents wholesale maximum prices for some 58 varieties of meat and edible by-products of beef, veal, lamb, mutton and pork were established on May 24 at about the level of March, 1942, prices. A wide assortment of variety meats and byproducts—including brains, kidneys, sweetbreads, tripe and many meats used in sausage—was covered by the new MPR 398, effective June 1.

Sea Herring—Dollars-and-cents maximum prices per case were set on May 25 at the canner level for Atlantic sea herring and alewives at prices in line with those already established for Maine sardines. In MPR 396 the basic maximum price is set at $5.40 for a case of 48 No. 300 cans, plain, in sales to government procurement agencies, identical with that set last year by the Food Distribution Administration for certain canners who packed the fish for it.

Foreign-Type Cheeses—Amendment 3 to MPR 280 permits sellers of all cheese produced in the 48 states to add 3 cents per pound to the maximum prices approved in the original order. The 3-cent increase shall not be applied to those stocks of cheeses which were in the seller's possession prior to Feb. 10, 1943, and it does not apply to the following types of cheese: Processed cheese, cheddar cheese (covered by MPR 289), aged

TO WORK FOR ARMY

Appointment of B. E. Proctor, professor of food technology at Massachusetts Institute of Technology, to the position of Director of the Subsistence Research Section of the Quartermaster General's Office was announced by the War Department on June 9. Mr. Proctor succeeds Frederick C. Blanck, who will return to his former post as chief research chemist of the H. J. Heinz Co., Pittsburgh.

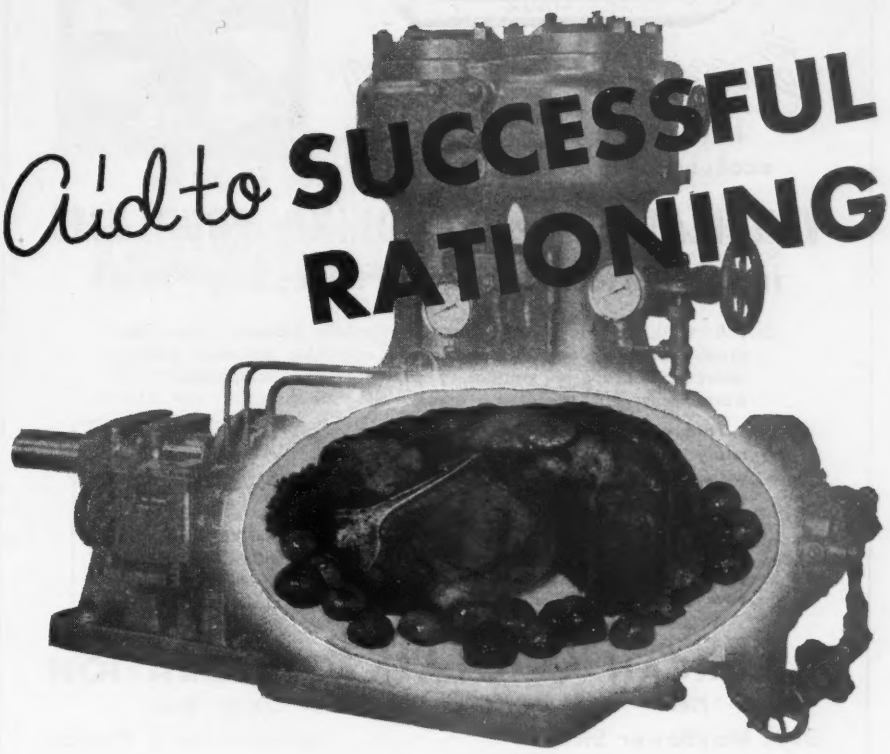
cheddar cheese (covered by MPR 280), Colby cheese, washed curd cheese, Monterey or jack cheese, other cheeses of cheddar class having a moisture content of 40 percent or more, cottage cheese, baker's cheese, pot cheese, smearcase cheese, Neufchatel cheese and all other cheeses of less than 20 percent butterfat content.

Peanut Products—Price control over peanuts and peanut products—from the farm right through to the consumer—was restated on May 22 in the issuance of a revised maximum price regulation, including 11 changes for these commodities. Changes were explained in RMPR 335, effective May 27.

Stettinius Releases Lend-Lease Figures

LEND-LEASE exports of beef and veal were shipped at the rate of about 1 lb. out of every 100 lb. of our supply for the first four months of 1943, according to figures released early in June by E. R. Stettinius, Lend-Lease Administrator. This compares with the lend-lease exports of 0.2 lb. out of every 100 lb. for 1942. About 15 lb. out of every 100 lb. of lamb and mutton was exported in the first four months of 1943, and 13 lb. out of every 100 lb. of pork. Lend-Lease shipments of butter and cheese are below what they were in 1942, with ½ lb. of butter out of every 100 lb., and 23 lb. of cheese out of every 100 lb. of available supply now being exported. Canned vegetables and fruits and juices are being shipped in about the same proportion as in 1942.

Food is a WEAPON and REFRIGERATION *makes it Mighty*



It's significant that most of our Rationed Food is perishable. It must NOT spoil or be wasted for it's the lifeblood of the "production army" that supplies fighting armies with the means to victory.

On America's MECHANICAL REFRIGERATION depends the success of our food program from food in the field thru processing, distribution, and final home storage by Ration Book holders.

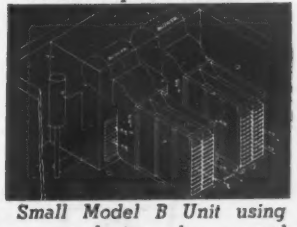
Your Refrigeration will be called on for greater capacity, continued peak efficiency with the least possible amount of service attention and repair. We, at Vilter, offer you the engineering skill and knowledge to help you obtain the MOST out of your equipment — at the least cost. Can we help you?

ARMY-NAVY "E"
Awarded to Vilter for Outstanding War Production.

Superior Since 1867
VILTER
Air Conditioning Refrigeration . . .

VILTER FRIGID BLAST FREEZERS . . .

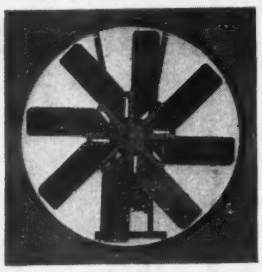
Typical of Vilter pioneering in faster, more economical food freezing. Custom-engineered to your needs.



Small Model B Unit using open-end trucks moved against FRIGID BLAST Blowers.

THE VILTER MFG. COMPANY
2115 SOUTH FIRST STREET, MILWAUKEE, WISCONSIN
OFFICES IN PRINCIPAL CITIES

Coolair
TRADE MARK
Breeze-Conditioning



is the most practical and economical system for solving

VENTILATING and COOLING PROBLEMS
in Canneries and Food Processing Plants

A well designed installation of Coolair Exhaust Fans can greatly increase employee efficiency and help decrease absenteeism by properly ventilating and lowering temperatures in work-rooms and processing spaces in your plant.

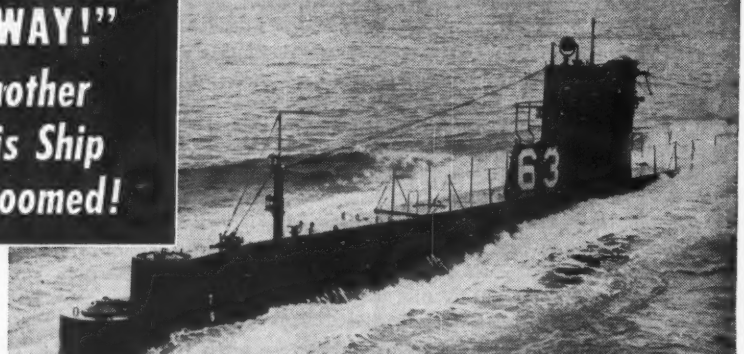
Prompt shipment can be made on many types and sizes of Coolair Fans with certified air deliveries of from 6,000 to 142,000 cfm on your orders bearing priority ratings of AA-5 or better.

Should CMP Regulation 5 not cover your requirements, file form PD-1A with your nearest WPB Field Office.

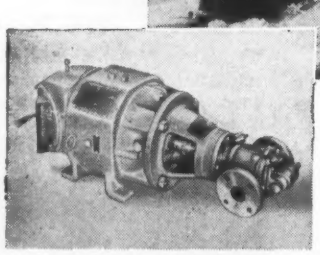
CATALOG PAGES
Fan models, dimensions and performance data can be found
in SWEET'S
ASHVE GUIDE and
ELECTRICAL BUYER'S
REFERENCE

AMERICAN COOLAIR CORPORATION
"Pioneer Manufacturers of V-Belt Drive Exhaust Fans"
3604 Mayflower Street Jacksonville 3, Florida

"TORPEDOES AWAY!"
. . . Another Axis Ship Is Doomed!



OFFICIAL U. S. NAVY PHOTOGRAPH SHOWING SUBMARINE STARTING A QUICK DIVE


VIKING FUEL OIL DELIVERY PUMP

One of Viking's many War-time jobs is to build fuel oil and lube oil transfer pumps, as pictured here, for submarines of the United States Navy.

This Viking pump is compact in design for use in cramped quarters. It is integrally mounted on the end of the motor and is connected by means of a flexible coupling. It is constructed of a special bronze to resist salt water conditions, with capacity and speed suitable for service performed.

Now just a word to civilian customers. When you are unable to get Viking Rotary Pumps at all . . . or to get them only after considerable delay . . . remember that WINNING THE WAR is Uncle Sam's big job right now . . . that the U. S. Navy has *first call* on Viking's production facilities until Victory is won. Thanks for your patriotism and patience.

VIKING PUMPS — FIRST IN AMERICA

VIKING Pump COMPANY
CEDAR FALLS, IOWA

WPB Orders

Burlap Bags—Under an amendment to M-221, issued June 11, the number and quantity of products which can be packed in new burlap bags was increased, reflecting an improvement in the supply of burlap. Under the amendment, flour, petroleum waxes and stearic acid are permitted to be packed in the bags, and more new bags were allotted for packing processed feed and seed and grain. Users were assigned an annual quota of new burlap bags and may not accept delivery of more than their quota.

Paper Shipping Sacks—L-279, issued by WPB on June 11, now controls paper shipping sacks for packing foods, seeds and other specified products, replacing M-221. The restrictions under L-279 are the same as those previously imposed by M-221, except that the 3-lb. sack for sugar is no longer permitted. Products covered by L-279 are: beans, flour (milled wheat), meal, potatoes, feed rice, salt, seeds, starch and sugar.

Wooden, Fiber Containers—WPB on May 28 took steps to assure a sufficient supply of wooden and fiber containers for shipping canned foods to the armed forces and civilians. The preference rating for the procurement of wooden or fiber containers for shipping canned foods, glass food containers (except beverage bottles) and closures was raised to AA-3, from AA-4, under terms of P-140 as amended.

Tin—Technical changes in the tin order, M-43, were issued to May 25 to correct certain inequities in the conservation of the nation's supply of the product. The use of tin for tinning and retinning equipment used in the preparation of food by institutions, industrial and commercial establishments is now permitted. This is necessary because of the limited amount of new equipment available.

Citric Acid—Effective July 1, citric acid, derived from citrus fruits and fermentation of molasses and used in making foods, beverages and candy, will be placed under allocation, to assure equitable distribution. After July 1 no supplier may use citric acid except for refining, or deliver citric acid for any purpose except on express authorization of WPB.

Ratings for Poultry Processors—Commercial poultry processors are eligible, upon WPB authorization, to obtain AA-3 ratings for the procurement of materials for replacement, or for more efficient operation, under P-118 as amended on June 3. Order P-115 (Plants for Canning or Processing Fruits, Vegetables or Fish) also is amended to remove provisions of the order which automatically assigned high preference ratings to maintenance, repair and operating materials. Such preference ratings now are assigned by CMP Regulation 5.

Malt-producing Facilities—Restrictions imposed by M-288 on malted grain or malt sirup inventories of brewers who produce their own malt were removed under the terms of the amendment to the order, issued

June 2. Previously, such brewers were not permitted to maintain an inventory of malted grain or sirup exceeding their inventory of the corresponding month of 1942. A brewer having a malted grain quota is permitted to substitute this quota for malt sirup, and vice versa.

Strapping for Shipping Containers—A shortage in wire strapping for shipping containers resulted in an amendment to M-261, issued June 7, restricting commercial use of the wire unless the weight of the container and contents exceeds 90 lb. or unless the strapping is essential to safe delivery in wooden or fiber containers holding fruits, vegetables, meats, fish or poultry; or the strapping is for wooden lard or butter tubs, and wooden buckets or pails.

Vitamin A—An amendment to L-40, issued June 2, reduces the quantities of Vitamin A that can be consumed in the manufacture of multivitamin preparations for human consumption. With certain exceptions, no person shall on or after April 10, 1942, manufacture any preparation represented to contain more than 5,000 U.S.P. XI units of vitamin A in the largest daily dosage recommended by the manufacturer or seller for adult use.

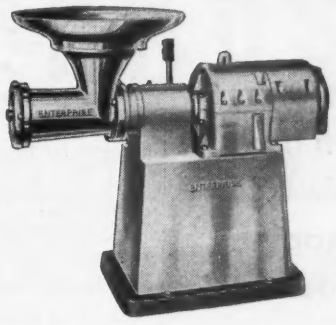
Byrnes Issues Program For Canning Industry

To ASSURE an adequate supply of process vegetables, several steps will be taken by various governmental agencies, according to the Director of Economic Stabilization. The purpose of this program is to maintain fair and equitable returns for the canning industry, and at the same time prevent increases in the consumer prices of essential cost of living items. These items are green peas, snap beans, sweet corn, canned tomatoes and other primary tomato products. The director's instructions to WFA, OPA and NWLB are as follows:

1. No increases shall be made in the ceiling prices of canners for sales of these four products to the civilian trade.
2. Ceiling prices shall be established for sales to government agencies that will reflect the current cost of raw materials and processing.
3. The Commodity Credit Corp. will carry out its purchase and resale program in accordance with the agreement entered into with the processing industry, with respect to the pact for civilian consumption.
4. Under the hardship clause of the contracts of CCC, the corporation will absorb that portion of additional processing cost, represented by approved increased wage rates, necessary to permit individual processors to obtain net returns from the 1943 operations in line with the average for the industry during representative prewar years.
5. For minor vegetables, which are not essential cost of living items, approved increased raw material cost, and approved wage rate increases will, where necessary to assure the processors the margins required by law, be reflected in higher ceiling prices.

HAVE YOU A FOOD CHOPPING PROBLEM?

Today, many different types of food are being successfully reduced by "Enterprise" Choppers—nuts, carrots, spinach, meats, etc.; also foods with high sugar content like dried figs, apricots, prunes.



Whether it's for dehydrating or regular processing, "Enterprise" Choppers offer the kind of fast, low-cost cutting demanded today.

These are some of the features of the new "Enterprise" Master Series Chopping Machines:

- ***Adaptability to fast production lines***
- ***Dependability for nearly every type of food***
- ***Razor sharp cutting action that retains juices***
- ***Fully automatic operation—saves manpower***

If you will let us know your specific problem—type of food, size of cut required, capacity expected—we shall gladly send you full specifications of models suggested for your use. Address Dept. 403.

ENTERPRISE MFG. CO. of PA.

3rd & DAUPHIN STS. PHILA., PA., U. S. A.

Choose your Package the easiest way . . .

from this Portfolio of samples and data on *all* available types of paper packagings suitable for your use!

Yes, you can get the complete packagings picture without endless shopping around! We are able to supply *any* type of package for *every* kind of food that can be packaged in paper and, consequently, we can furnish samples and comparative data on *all* eligible packagings—all under one cover, for your easy evaluation and decision.

Just write us on your letterhead; give (1) description of product to be packaged; (2) size of package required, or unit quantity of product to be packaged; (3) quantity of packages to be used—so that prices can accompany samples. That's all you need do! We'll send the portfolio of samples and data relevent to your problem. And, there's no obligation whatsoever.

Packaging Division
E. W. TWITCHELL Inc.
Public Ledger Bldg., Philadelphia, Pa.

"Specialist in Special-Purpose Paper Packagings" . . .

Shortages and Substitutes Discussed by Candy Men

Outlook not good for some materials, but several alternate ingredients can be employed

AT THE WARTIME CONFERENCE of National Confectioners' Association, held in Chicago, June 2-4, the problem of raw materials received considerable attention. At the forum session on the outlook for raw materials, Gordon Peyton, of the Food Distribution Administration, told the confectioners that no restrictions would be placed on edible products if anything else can solve the problem. Other significant facts which came out at this session were that the use of cocoa beans, comprising 15 percent of confectioners' raw material, is increasing for Lend-Lease and Army products. In respect to peanuts, the 1943 crop shows promise of being the largest in history, probably 4,000,000,000 lb., but a substantial amount of peanuts is now being crushed for oil. The situation in milk and milk products will be very tight before the end of 1943, and not a great amount of coconut is available to the candy industry this year.

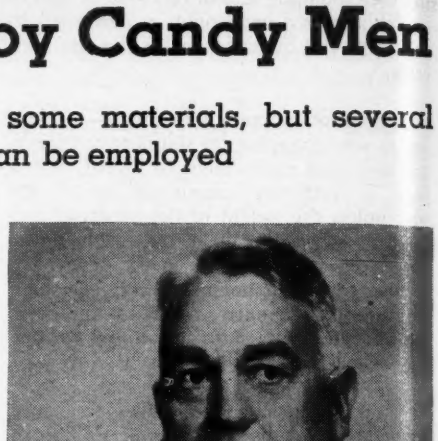
The corn sirup situation is acute, according to L. G. Preston, American-Maize Products Co., who stated that there will not be any corn sirup by the middle of July. The only solution to this shortage is considered to be the release of government-held corn.

Information on the use of new and substitute ingredients was given by James A. King, Nulomoline Co. He said that industry has little to offer as substitutes for citric and tartaric acids, but maleic and lactic acids are used to a limited extent to stretch the existing supply of these acids.

The natural replacement product for powdered, flaked or granular albumen, or dried egg whites, will be either fresh or frozen egg whites, when and if obtainable. Powdered soya protein derivative is used to replace, either partly or completely, the albumen in various types of candies, notably in grained confections. For agar agar, a vegetable colloid and buffer, salt and a fruit acid are used, as is carrageen, or Irish moss, which has given very good results.

The only ingredient available to replace sweetened condensed milk, evaporated milk or powdered milk is soya flour. It may be used as approximately 5 to 10 percent of the weight of the total batch, depending on the candy made.

Two producers of pectin reported that both citric and apple pectin will



PHILIP P. GOTT

be available in larger quantities in one or two months. Simulated cocoa powders of high food value also are being offered. They are combinations of roasted barley, wheat flour, edible oils and simulated chocolate flavor.

As an alternate for dried coconut, corn flakes sweetened with sugar and flavored with simulated coconut flavor and salt are available. Toasted soya grits are used to replace toasted coconut as a garnish on marshmallows.

Approximately 500,000 lb. of waxy corn and waxy sorghum starch is available, these starches being similar to tapioca flour.

The confectioners again named Philip P. Gott president of NCA. Other officers are: Arthur L. Stang, Cracker Jack Co., Chicago, Ill., secretary-treasurer, reelected; Charles F. Scully, Williamson Candy Co., Chicago, Ill., and Harry L. Brown, Brown & Haley, Tacoma, Wash., vice-presidents.

More Canned Foods Will Go To Civilians

APPROXIMATELY 30,000,000 cases of the 1943 pack of canned foods—vegetables, fruits and fruit juices—originally marked for government use will be released for civilian purchase, according to a recent War Food Administration announcement. The reduction in government takings will include 7,000,000 cases of canned fruits and juices and 23,000,000 cases of canned vegetables,

and will consist primarily of corn, peas, spinach, tomatoes, snap beans, fruit cocktail, sweet cherries, peaches, pineapple and pineapple juice. The new order, which changes the "set-aside" percentage, specifies the quantities of each canned fruit and vegetable product which must be reserved to meet government requirements, including contingency reserves of from 2 to 11 percent which must be held by canners to assure the meeting of emergencies.

Civilians Profit By Revised M-81

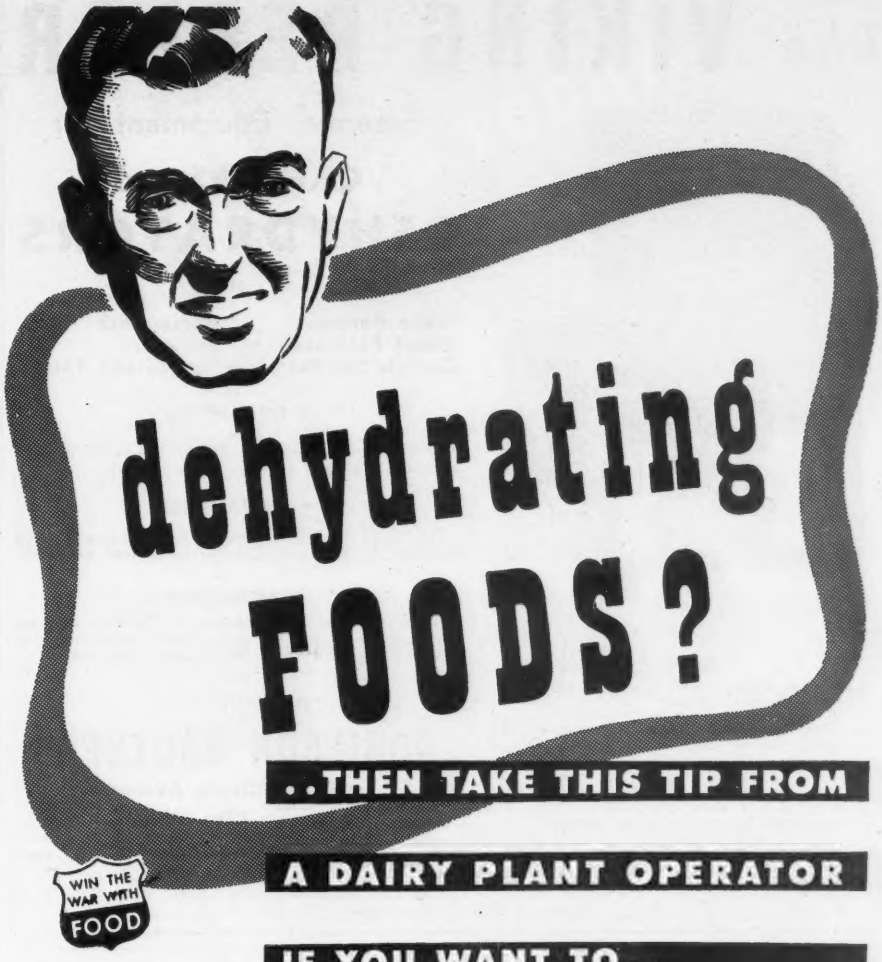
Cut in government requirements releases six commodities from 1943 pack to civilians

As THE RESULT of a further amendment to Order M-81 issued on June 11, civilians will receive six types of canned fruits and vegetables from the 1943 pack formerly limited to government requirements. The additional products are applesauce, blueberries (or huckleberries), figs, beets, carrots, pumpkin and squash. Approximately 7,500,000 cases of these six commodities will be available to civilians through curtailment of government requirements for canned foods. Canners may still pack the quantities equivalent to government requirements of the original order, with the difference between the old and new set-aside percentages to be available to civilians. No change is made in the quota of tinplate for the six products.

Another amendment to M-81 announced early in June permits the use of cans made of 1.25 hot dipped tinplate for these products in brine: Atlantic sea herring, Pacific sea herring and pilchards. Cans for packing any food or nonfood product not listed in Schedule 1 or 2 are exempted from M-81 for the first time if the cans are required for packing a product for delivery to a ship chandler, marine distributor or marine operator.

Form Soya Research Council

RESEARCH men of the various companies manufacturing soya flour met recently in Chicago to form what is to be known as the Soya Food Research Council, with headquarters at 3818 Board of Trade Building. The council will pass on all technical information on soya flour put out by the parent association, the Soya Flour Association, as well as collect data on all technical matters pertaining to soy flour through research in the laboratories of the individual members, collaborative research in those laboratories, and by placing research in the various colleges and experiment station laboratories.



Dehydrating of foods . . . like the processing of milk . . . is a ticklish business. Off-tastes, off-flavors, spoilage are a constant threat . . . unless rigorous sanitation measures are effectively employed.

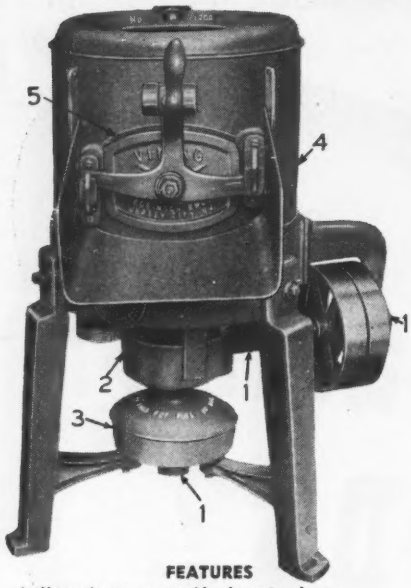
To assure maximum protection of milk quality, almost half of the nation's dairy plants have put their sanitation problems in the capable hands of the Diversey D-Man . . . because the Diversey D-Man is a specialist in sanitation. Procedures developed by Diversey Research Technicians have been proven by over 17 years of practical experience in an industry where sanitation of diversified and complex equipment is imperative.

The knowledge and skill thus gained have already been successfully applied to the processing equipment employed in the dehydration of foods. Without cost or obligation a Diversey D-Man will gladly make a detailed survey of your dehydrating operations and submit specific recommendations that assure maximum protection of quality . . . minimum risk of off-tastes and flavors showing up in your product weeks after shipment. Just write The Diversey Corporation, 53 W. Jackson Blvd., Chicago, Ill.

Put your sanitation problems in the capable hands of a trained expert... the

DIVERSEY D-MAN

The VIKING PEELER



Essential Equipment for
CANNERS and DEHYDRATORS
of

White Potatoes	Horseradish
Sweet Potatoes	Radishes
Carrots and Beets	Turnips and Yams

• OPERATION

Peels and washes—and drains peelings—**all in one operation;** belt or motor driven.

• CAPACITIES

50 to 60 lbs. per minute—1,000 lbs. per hour
70 to 75 lbs. per minute—1,400 lbs. per hour

• ECONOMY

Waste reduced to absolute minimum—and recoverable for cattle feed. Most economical in first cost, operation, maintenance and space.

FEATURES

1. Heavy bronze removable sleeve bearings.
2. Cut bevel gears, 4 Pitch.
3. 10" dia. thrust bearing running in oil.
4. Genuine carborundum abrasive FUSED onto entire inner surface of peeling Hopper and upper surface of revolving Disc. Abrasive cannot be torn by foreign material in Hopper.
5. Mounted one piece rubber gasket guaranteed water-tight for the life of the machine.

Manufactured by

ROBINSON BROTHERS
153-155 Clarke Avenue
Jersey City, N. J.

Contractors to:
U. S. Navy Department; U. S. Army Medical, Quartermaster & Engineer Corps; U. S. Dept. of Justice; U. S. Veterans Bureau; U. S. Marine Corps; Civilian Conservation Corps; State, County and Municipal Governments.

Trustworthy—
IN "GREEN" HANDS

When experienced help is scarce, the use of a thoroughly dependable cleaner is a "must". Metso is your trustworthy cleaner for removing all grease, oil and solid matter. In addition, it aids in preserving your irreplaceable equipment.

This safety feature of Metso is due to its unique silica (SiO_2) content which balances the cleaning action, protecting against chemical attack. Put Metso to work in your plant.

Sodium Metasilicate U. S. Pat. 1898707

PHILADELPHIA QUARTZ CO.
Gen'l Off.: 125 S. Third St., Phila., Pa. ◦ Chicago Sales Off.: 205 W. Wacker Dr.
Sold in Canada by National Silicates, Ltd. • Distributors in over 60 Cities

METSO CLEANERS

WFA Orders

Dehydrated Sweet Potatoes, Carrots—WFA on June 9 released sweet protatoes and carrots from the list of dehydrated vegetables reserved for war needs because prospective supplies appear to be sufficient to meet all requirements. The amendment to FDO-30 requires processors of these products to continue holding the stocks on hand June 1 for delivery to the government or alternative disposition by the director of Food Distribution.

Dehydrated Vegetables—Amendment 1 to FDO 30, issued June 9, makes further restrictions on sale and delivery of dehydrated vegetables. Without regard to existing contracts, every processor shall set aside for government agencies 100 percent of all dehydrated vegetables in his posession on the effective date of the order, and 100 percent of all dehydrated Irish potatoes, cabbage, beets, onions and rutabagas processed subsequent to the date of order.

Dry Skim Milk—Each person who was required to set aside dried skim milk according to the terms of FDO 54, in amendment 1 to that order issued June 2 was asked to set aside in the calendar months of June and July, 1943, a quantity of spray-dried skim milk equal to 75 percent of all spray-dried skim milk he produced in that time, and a quantity of roller-dried skim milk equal to 75 percent of all roller-dried skim milk he produced in that time.

Beef Quotas—All livestock slaughterers operating under Federal inspection are now required, effective June 14, to set aside 45 percent of all the steer and heifer beef they produce which meets Army specifications. FDO 28.2 applies to weekly production of beef and does not apply to inventories. Deliveries of the reserved beef must be made in the form of boneless and carcass beef.

Beef and Pork—To make meat produced in excess of civilian quotas more readily available to government purchasing agencies, frozen and cured beef and pork inventories of all slaughterers, wholesalers, meat handlers and meat processors were restricted beginning June 12. Weekly inventories of "restricted" beef and pork held by all persons whose average sales are more than 40,000 lb. per week will be limited by formulas based, in the case of slaughterers registered under MRO No. 1, on their average weekly quotas under that order.

Corn Purchases—Voluntary certification of purchases and deliveries of corn and the exempting of white corn for food processing from inventory limitations in FDO 52 are provided in a revision of the order issued June 7. The amendment also provided for termination of the order on July 1, since a freer movement of corn off the farms is expected by that time.

Shell Egg Storage—Shell eggs placed in storage before March 25 may remain in storage after June 15 under the shell egg reservation order. The change, immediately effective as

an amendment to FDO 40, issued June 11, was made because owners stored the eggs under what they considered normal conditions and had no way of anticipating issuance of the reservation order.

Coconut, Babassu Oils—WFA on June 3 released two major high lauric acid oils—coconut and babassu—from government reserve for inedible use in industry. Recent imports made the release possible.

Glass Container Order Amended

Cut-off date for manufacture of non-standard containers is set for listed foods

LIMITATION ORDER L-103 was amended on June 8 clarifying dates before which certain types of non-standard glass containers must be manufactured in order to be used for packing any product which has been made the subject of standardization and simplification.

The dates on which manufacture of nonstandard containers is to be discontinued for each product in the L-103 schedules include:

February 11, 1943, for distilled spirits and malt beverages; June 12, 1943, for fruit butter, preserves, jelly and wines; September 7, 1943, for protective coatings; January 5, 1944, for salad dressings, olive oil, edible oils, shortenings, maple sirup, other sirups including chocolate, tomato catsup, chili sauce and cocktail sauce, tomato paste (not less than 25 percent by weight dry tomato solids), tomato pulp and puree (not less than 10.7 percent—specific gravity 1.045—or more than 25 percent by weight dry tomato solids), vinegar, fruits and vegetables and mixtures thereof, honey, pickles and relishes, peanut butter, fruit and vegetable juices and mixtures thereof, green olives, Maraschino cherries, cranberries and cranberry sauce and liquid pectin.

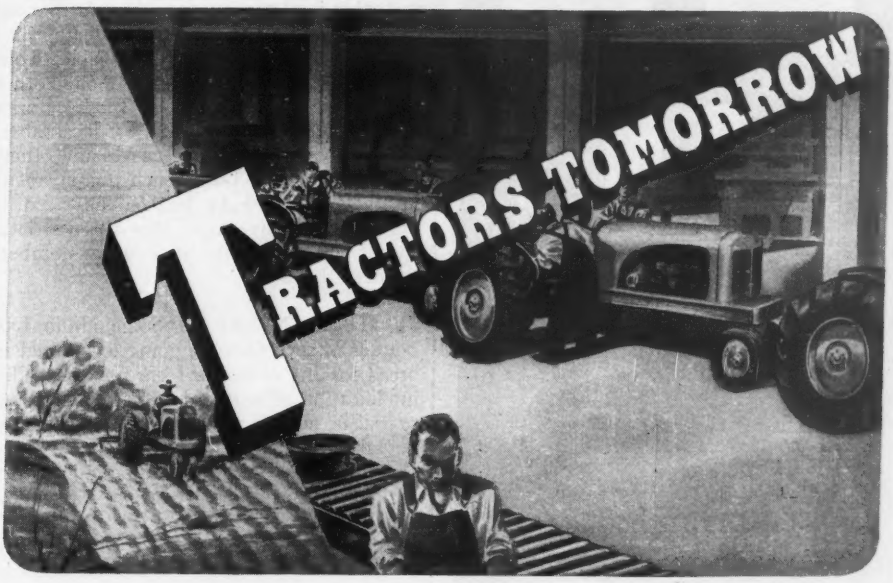
More U. S. Standards Out

TENTATIVE United States standards for grades of canned pineapple, canned pineapple juice, fruit preserves, dried skim milk and dried whole milk have been issued recently. Through use of the new regulations the Department of Agriculture seeks to establish a consistent standard of excellence so that grades will assure satisfactory quality for wartime handling.

SCHEDULE OF EVENTS

AUGUST

3– 5—International Apple Association. 48th annual meeting, Hotel Sherman, Chicago, Ill.
18–21—Special Rationing Conference. National Association of Food Distributors, annual convention. Hotel Sherman, Chicago, Ill.



- - - Standard Conveyor Engineers Will Be Ready —With Added "Know-How" to Their 35-Year Experience Record—For Conveyor Jobs to Come

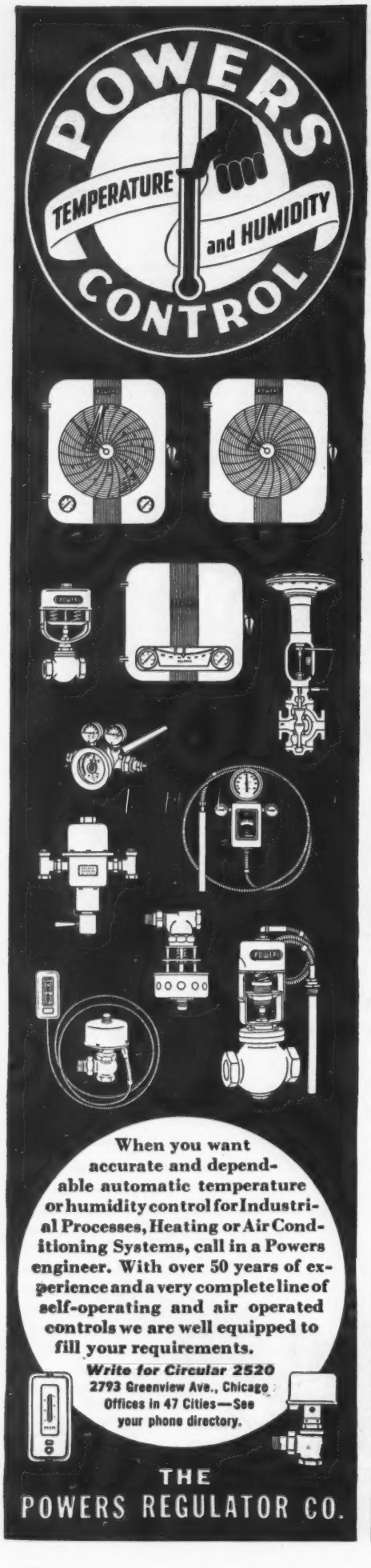
The experience record of the Standard Conveyor organization spans a period which includes two world wars.

For more than 35 years Standard Conveyor Company has concentrated on power and gravity conveyors. Such specialization has developed improved design and materials in the conveyors themselves and given Standard Conveyor engineers an invaluable reservoir of practical experience. Knowing how to apply power and gravity conveyors to best advantage is equally as important as building them well. Its service record with American business and industry attests Standard Conveyor Company's ability to do both.

Write for valuable reference book, "Conveyors by Standard" Catalog FI-7

STANDARD CONVEYOR COMPANY
General Offices: NORTH ST. PAUL, MINN.
Sales and Service in All Principal Cities

★ ENGINEERED FOR FASTER PRODUCTION ★


POWERS
TEMPERATURE and HUMIDITY
CONTROL
When you want accurate and dependable automatic temperature or humidity control for Industrial Processes, Heating or Air Conditioning Systems, call in a Powers engineer. With over 50 years of experience and a very complete line of self-operating and air operated controls we are well equipped to fill your requirements.
Write for Circular 2520
2793 Greenview Ave., Chicago
Offices in 47 Cities—See your phone directory.
THE
POWERS REGULATOR CO.

CAPITAL VIEWS

FLAVOR SPOILAGE – Manufacture of numerous foods needed for Army and Lend-Lease use has been stopped. This has been done to permit reconsideration of specifications, packaging and transport. Deliveries made heretofore have been so unpalatable at destination that they were not satisfactory. It is extremely important that the limits of temperature exposure in transit for any particular food packaged in the best available manner be soon determined. Only then will it be possible to ensure that deliveries of these foods will provide a usable, palatable product to the armies in the field and our allies at remote destinations. There are many unsolved problems to which technologists must give prompt attention.

PATRIOTIC APPEAL—Labor for canneries and other food processing plants must be obtained at all cost. Without adequate labor there will be great loss of perishables from America's crops of 1943. Among other things, local managements of food factories must make a patriotic appeal for local labor. High school students, housewives and others never before accepting such employment must be induced to help. The need is urgent. In many cases, only this patriotic appeal will bring folks in adequate numbers to meet the need.

PROTEIN IN BREAD—Some millions of pounds of soya flour are going to be used in bread making each year from now on. This modification of normal bakery practice is essential because of milk shortages. Care must be taken in promoting soya flour to avoid the improper claim that a pound of this high-protein material is equal to a pound of dried skim milk. Appropriate percentages must be worked out for each bread formula if the industry is going to maintain the desirable protein content of breadstuffs during this time of protein shortage.

FOOD, NOT FADS!—Some zealous proponents of better diet went to the International Food Conference to promote the idea that higher standards of living for the common people must be provided throughout the world. Apparently these fadists were stepped on rather rudely by some of the realists from other parts of the world. These foreign delegations very rightly emphasized the fact that giving enough food of any kind to suffering populations is more important right now than to develop high nutritional standards. It would not do any harm if some of the Washington officials using nutritional fads for political purposes were to adopt this realistic attitude also. Fortunately, the final conclusions of the Food Conference appear to have done so, even though the findings are in rather vague diplomatic language.

THREE TROUBLES—The American food industries are suffering from the effects of floods and strikes and official mismanagement. Sometimes it seems as though the last of the three was the most serious. Certainly it is the most persistent. Strangely enough, it now appears that industrial executives and the members of Congress are very close together in their philosophy about some features of executive management, especially in OPA. These legislators are beginning to understand the serious consequence on the business of feeding America which comes from meddlesome amateurs. The needed improvement which is resulting comes slowly but should be appreciated nonetheless.

LONG-RANGE PLANS—Plant executives must look farther ahead in their planning for essential plant equipment. A plan for critical machinery like the Controlled Materials Plan for steel, copper and aluminum is in the making. The simple priority system which can work on short notice is likely to be superseded gradually, and only long-view plans for purchasing will then work.

PLANT LOCATION—Any food company that must establish new plants or expand old ones must now take account of labor shortage areas. Each month WPB issues lists showing the relative scarcity of labor in different communities. Planning without consulting such a list represents mismanagement which is likely to be very serious.

NEW SHORTAGES—A year ago it looked as though shortages of sugar and coffee, to name but two obvious shortages, were going to be bottlenecks in both industrial planning and housekeeping. Now it is seen that far more fundamental shortages, including scarcity of corn and wheat, may be the real worries for the food business. More generous allocations of sugar to industry are promised, and the public is pleased that a pound of coffee now need not last quite as long. We have not yet felt, but should be quite ready for, the corresponding difficulties when there are not enough supplies of grains to feed both man and the desirable animal populations.

That day will come within the visible forecastable future.

COAL SUPPLY—Plant coal supply is going to cost food manufacturers a lot of money. There will be long-continued increases in the prices of coal deliveries at the boiler rooms. But it will be dangerous to postpone coal purchases in the hope that some lower prices can be found. Even high-cost coal is better than none when the factory must operate.

LATIN OPPORTUNITIES—Brazil now has a huge surplus of oranges which it cannot export through normal channels because of limited ship space. This is one of numerous opportunities for American enterprise to do business in Latin areas for the manufacture of food products. Nationalistic regulations of our "Good Neighbors" are difficult to meet but not always insurmountable.

Industrialization of the food business of those nations is going to come about during the next decade. There is a real chance for American experience and enterprise to have at least some part in the development.

Corn Shortage Becomes Acute

Heavy livestock feeding leaves little available for industrial uses. Problem is complex

THERE is little or no corn available for manufacturers and none for whiskey or industrial alcohol distillers until after the new crop. Corn is staying on the farms to feed the record number of beef cattle and hogs being grown this year. The corn-hog ratio, still up to 13.6 on May 15 as compared to the long-time average of 11.7, explains why the farmer is feeding his corn rather than selling it.

In Washington, great pressure is being brought to bear on War Food Administrator Davis to do something to reduce "the number of hogs and beef animals that are now eating the nation into the poorhouse." Some of the statistics which are being presented are significant. For one thing, hogs are now being fed to heavier weights. Yet the amount of lard being recovered is less than formerly. Packers are not trimming hams as closely, and wastage of fat amounts to about 3 lb. per animal, according to the figures of the industry. At the present rate of slaughter the waste of lard amounts to approximately 13,500,000 lb. per week, with a corresponding waste of the corn fed.

The most obvious solution would be to allow corn prices to seek their level without control of any kind. This action would make feeding less profitable, but it would make inflationary price adjustments necessary for the end products of the industries absorbing the high-cost corn.

WFA Acts To Ease Milk Shortage in Fall

WAR Food Administration is already taking two kinds of steps in the lush milk season to prevent some of the unfortunate consequences of the milk shortage anticipated next fall. First, they are setting up plans to cut demand by industry; and second, they are preparing aids for greater farm production of milk.

An abnormally large percentage of Cheddar cheese is being held now under freeze orders for Army and Lend-lease. Rationing of soft cheeses to the public has been started. These two moves are but part of the evidence that official Washington knows that there will be a serious shortage of fluid milk next fall unless measures are taken now. By these controls, and others less obvious, it is hoped that less demand on the fluid milk supply for other dairy products

TO HELP YOU HELP KEEP U.S. STRONG

SODIUM FERRIC PYROPHOSPHATE
MONOCALCIUM PHOSPHATE
DICALCIUM PHOSPHATE
TRICALCIUM PHOSPHATE
MONO SODIUM PHOSPHATE
DISODIUM PHOSPHATE
CALCIUM PYROPHOSPHATE
SPECIAL PHOSPHATES
IODIZED MIXTURES

To help you provide the properly balanced diet so essential to a fighting America... these mineral supplements of exceptional purity... and the experience of our technical staff are at your service.

As the nation's largest producers of elemental phosphorus—from which our phosphoric acid and food grade phosphates are derived—Monsanto is in an excellent position to be of real help in your food fortification problems. For samples or the assistance of our technical staff, inquire: MONSANTO CHEMICAL COMPANY, Phosphate Division, St. Louis, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal, Toronto.

"E" FOR EXCELLENCE—The Army-Navy "E" burgee with two stars, "representing recognition by the Army and the Navy of especially meritorious production of war materials" over a two-year period flies over Monsanto.

MONSANTO CHEMICALS

SERVING INDUSTRY...WHICH SERVES MANKIND

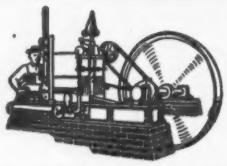
Sole Representatives

of the Combined Engineering and Manufacturing Facilities

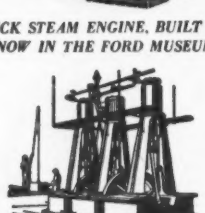
— of —

MERCER ENGINEERING WORKS, INC. WORKS: CLIFTON, N. J.

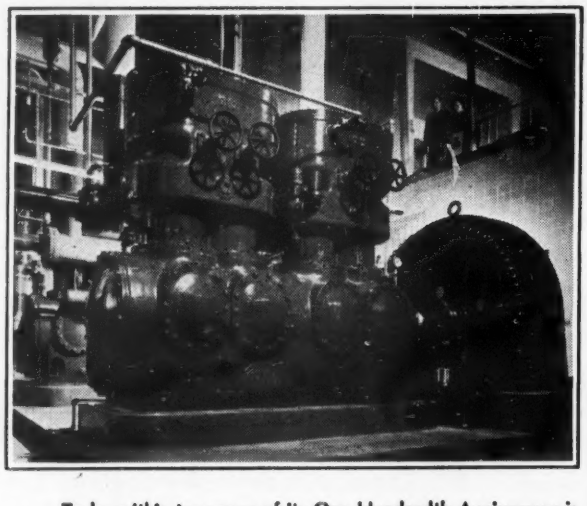
ROBINSON MANUFACTURING CO. PLANT: MUNCY, PA.



FRICK STEAM ENGINE, BUILT 1856
NOW IN THE FORD MUSEUM



FRICK REFRIG. MACHINE OF 1883



90 Years' Engineering Experience Stands Behind

To be within ten years of its One Hundredth Anniversary is a distinction enjoyed by very few companies in America.

Frick Company was established in 1853 for the building of steam engines. The success of these led to the construction, in 1882, of the first Frick Refrigerating machine.

Today, Frick cooling systems are put into war service as fast as they can be made. Tomorrow, you can get the advantages of up-to-date Frick Refrigerating, Ice-making, and Air Conditioning Equipment, backed by more than 90 years' experience.

FRICK COMPANY, WAYNESBORO, PENNA., U. S. A.

TRADE FRICK MARK

Refrigeration

will continue into the time when milk production declines seasonally.

These precautionary measures are only a part of the effort being made to prevent fluid milk rationing. Provision of more dairy industry manpower and facilities is being arranged as fast as possible. By the combination of encouraged production and curtailment of use for manufactured products it is hoped that a possible supply of fluid milk may be retained on the larger industrial milk sheds.

Flour and Farina Standards Set

Upper and lower limits for vitamins and minerals given in proposed standards

ENRICHMENT of flour and farina to provide dietary needs in minerals and vitamins is defined by minimum and maximum requirements in proposed modified standards published by the Food and Drug Administration on June 5. In general, the government proposals for larger amounts and more accurately controlled quantities have been adopted in this proposed revision. Interested parties could still file exceptions to the findings of fact and proposed standards up to June 19.

In the new standards it is required that thiamin, niacin and riboflavin be present in all enriched flours and farinas. For flour, a narrow limit in permissible content of vitamins has been set by making the maximums 1.25 times the required minimums. In the case of farina, the maximum permissible is twice the required minimum. This wider range in farina is granted because of greater difficulty in accurate control and because of the lesser nutritional importance as a part of the national diet.

For various types of enriched flour, iron is made a required ingredient. Calcium is required only for some types of flour; in other types it is an optional ingredient.

The farina standards proposed give a wide range of possible content of the required ingredient iron. The minimum of 24 mg. per pound provides a significant quantity for adult use as a breakfast food. But when farina is used as an infant food a much higher content is desirable, up to the maximum permitted, or 200 mg. per pound. For farina, calcium remains an optional ingredient, but with a much higher minimum requirement than heretofore.

Further protest is expected against the tentative finding that vitamin D must be included in all enriched farina as a required ingredient. Spokesmen of

YUM, YUM—TASTY APPLES

The point of this picture is that the apples Rubylee Andres of Akron, Ohio, is eating were "preserved" from last November until this summer by packing them in Pliofilm. Made at Iowa State University, tests show that apples so packaged lost less than 1 percent in weight, withstood shrivelling and retained their original flavor. Research experts of Goodyear Tire & Rubber Co. said the apples could have been kept much longer without loss of edibility, but apparently Rubylee was hungry.

the industry argue that it should be only an optional ingredient.

Information from WPB indicates that adequate supplies of the required vitamins and minerals in usable form will be available to carry out the program completely on a national scale.

Milk Processing Plants To Get Army-Navy "E"

MILK-PROCESSING plants are now eligible for the Army-Navy "E" award for excellence in production. Awarded on a highly competitive basis, the "E" banner and employee buttons will be given only to those plants that have excelled in maintaining or increasing the quantity and quality of output in the light of available facilities.

India Has Big Wheat Crop

AN ALL-TIME record of 408,352,000 bu. is the official estimate of India's wheat crop for 1943, compared with that country's final estimate of 375,947,000 bu. in 1942. The 1943 crop appears to be sufficient for the country's requirements, but a more equal distribution of supplies will be necessary to avoid shortages and the need for import that existed in 1942 because of speculation and distribution difficulties.

Hot, humid summer days! It is when bacteria and mold thrive and multiply ... when EXTRA VIGILANCE is a *"MUST"* to safeguard product goodness and flavor.

Here is an effective defense against bacterial contamination and spoilage ... a "weapon" that surrounds your product with an *EXTRA MARGIN* of *PROTECTION*. FIRST, put all your processing, mixing and handling equipment, floors and walls in physically clean condition by removing vegetable and fruit particles, meat residues, grease, fats, sauce, syrup and other organic matter with the recommended fast-working Oakite detergent. THEN spray, flush, brush or swab surfaces with a solution of

OAKITE BACTERICIDE

(PROTECTED BY U. S. PATENT)

Due to its MORE ACTIVE form of AVAILABLE CHLORINE, it swiftly destroys bacteria, mold and mold spores to make QUALITY CONTROL more certain. This superior germicidal material is completely soluble, instantly ready for use. Drains freely, too...leaves no white residues on equipment!

No wonder plant after plant will tell you Oakite Bactericide is an invaluable ally for maintaining desired high sanitary standards!

Write Today For *FREE* Digests and Manuals!

Whatever product you are canning, packing, quick freezing, dehydrating ... fruits, vegetables, meat, fish, salad dressings, dairy products, etc., ... Oakite methods will help you increase sanitation efficiency, save time and conserve manpower on ALL your cleaning and germicidal work. Write for FREE digests and booklets giving details.

OAKITE PRODUCTS, INC., 26G Thames Street, NEW YORK, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE MATERIALS · METHODS · SERVICE — Buy Bonds for Victory — CLEANING FOR EVERY CLEANING REQUIREMENT

The

COCKROACH

The cockroach is a restless traveler—pulling out at night and often migrating far and fast. He takes his filthy, thieving habits into homes, groceries, restaurants, flour and feed mills, ships and other places where foodstuffs are handled and stored. He pollutes even more than he destroys.

FUMIGATE

Properly applied HCN gas is an effective fumigant for control of this and other insect and animal pests. Call on your local Pest Control Operator for a well planned fumigation program.

We have a book containing interesting information about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington, Delaware.

DU PONT
REG. U. S. PAT. OFF.

CYANEGG
REG. U. S. PAT. OFF.

AN ECONOMICAL SOURCE OF HCN FUMIGATING GAS

W. P. O. No. 1625

FLOOD SHUTS DOWN FOOD PLANT

Located about one-half mile from the bank of the Mississippi, the plant of Standard-Tilton Division of Russell Miller Milling Co. at Alton, Ill., was forced to stop operations temporarily by the recent flood. Sandbags, which may be seen in this view of the car loading docks, were used to cut off seepage into the basement, but before the seepage could be stopped enough water had accumulated in the basement to submerge the bottom flight of the large drive-wheel belt.

Some Food Industries Get Extra Gasoline

On the basis of degree of essentiality, a complete revision has been made in the list of industries to be accorded preferential treatment in the Eastern gasoline shortage area. The revised industry list was certified to ODT by WPB, replacing the original WPB list announced May 30. Food production and distribution industries eligible for preferential service are dairy products, fruits and vegetables, meat, fish, poultry, eggs (fresh and processed), bakery products, cereals, flour and meal, lard, shortening, margarine, coffee, sugar, tea, cocoa, extracts and spices.

Industry Approves Bottle Simplification

According to the Division of Simplified Practice, National Bureau of Standards, the recently proposed revision of Simplified Practice Recommendation R123-30 for carbonated beverage bottles has been approved for promulgation. The revised recommendation effective from May 1, 1943, for new production will be known as R123-43, Carbonated Beverage Bottles.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded June (thousands)	Total Awarded 1943 (thousands)
Bakery	$50	.....	.....
Beverages	.....	.....	.....
Canning and Preserving	40	.....	$115
Cold Storage	375	$40	155
Confectionery	.....	.....	40
Grain Mill Products	.....	1,200	1,797
Ice Manufactured	.....	.....	40
Meats and Meat-Products	56	.....	165
Milk Products	280	82	322
Miscellaneous	640	120	1,777
	$1,441	$1,442	$4,411

Method of Dehydrating Molasses Developed

Movement of molasses in greater volume from the Caribbean area to the United States is expected to result from a new process for dehydrating and packaging the product. As outlined by the Board of Economic Warfare, the dehydrating operation can be carried out at sugar mills with simple equipment and at small cost. The solid blocks of molasses produced can be stored for indefinite periods in ordinary warehouses, or sheds, and shipped, handled and stored as general dry cargo. Dehydrated molasses will not spoil, and it can be shipped in 40 percent less space.

Molasses treated by the new process is suitable when reconstituted only for the manufacture of commercial alcohol, and not for feeds. And the process has been tried only on a small scale.

Will More Foods Be Imported?

Recent improvements in the shipping situation, particularly with regard to the submarine menace, have already resulted in increases in the importation of some foods. This is particularly evident in cocoa imports, which this year are more than double the quantity brought in in the corresponding period

of 1942. Coffee is also coming in more abundantly.

If similar increases in the imports of sugar, vegetable oils and perhaps even of grain and meat can be made, it should do much to relieve the growing food shortages in this country. It might even prove to be possible to divert some of these possible imports to the allied and reoccupied countries, thus cutting down the drain on domestic production. This would require an increase in processing facilities in the supplying countries, a step that should be undertaken immediately.

Short Crops Tend To Shift Protein Sources

FORECASTS of crop yields made early in June bear out the predictions that the make up of food supplies will change radically over the next few years. It is evident that grain feeds—corn, wheat, oats, in particular—are not likely to be available in sufficient quantity to take care of existing numbers of livestock and that increases in livestock numbers will be impossible. It is also evident that supplies of protein feeds for animals will become more scarce.

This all points to a coming shortage of animal protein foods. It may prove possible to keep up the supplies of dairy products and eggs, but that will be done at the expense of the meat supply. Add to this the disturbances in the meat distribution stemming from the chaotic price situation, which has already made meat a rarity in the diets of most Americans, and it is evident that the food industries must be prepared to fulfill the needs for protein in large part from vegetable products.

While this shift may prove to be only an emergency affair, and former eating habits may be resumed when the war is over, it is quite likely that the shift may prove permanent. The result would be the establishment of new food processing industries in a large way, accompanied by considerable decline in the relative importance of many well-established food processing methods.

INDICATORS

Fishery products in frozen storage on May 1, 1943, totaled 21,226,534 lb., compared to 55,036,257 lb. on May 15, 1942, and to a 5-year average for May 15 of 42,392,000 pounds.

Tuna receipts at Southern California ports during the first four months of 1943 were 15,205,245 lb., compared to 7,482,414 lb. for the corresponding months of the previous year.

Cocoa imports into the United States for the first four months of 1943 were 1,679,565 bags compared to 766,629 bags for the like period a year ago.

Cattle, hog and sheep production in 1942 is reported by the U. S. Department of Agriculture at 41,300,000,000 lb. live weight, 13 percent above 1941 and 32 percent over the 1931–1940 average.

Oleomargarine sales in April, 1943, as indicated by internal revenue reports, totaled 39,474,404 lb., an increase of 36.5 percent over sales in April, 1942. For the first four months of this year, sales totaled 203,310,305 lb., 62 percent above the corresponding period of last year.

Chicks hatched in commercial hatcheries during April, 1943, numbered 313,648,000, an increase of 9 percent over the previous April record, made in 1942, and 28 percent over the 1938–1942 average April output. Total production for the first four months of 1943 was 769,412,000, an increase of 13 percent over the corresponding 1942 period.

Eggs, liquid, produced by commercial egg breaking and drying plants in April, 1943, totaled 182,235,000 lb., 29 percent over April production last year.

Eggs, frozen, produced in April, 1943, totaled 79,000,000 lb., compared with 59,001,000 lb. in April, 1942.

Eggs, dried, produced in April 1943, totaled 28,330,000 lb. dry weight, compared to 22,524,000 lb. in April, 1942.

Butter, creamery, produced in April, 1943, was estimated at 150,185,000 lb., up 0.4 percent over production in April, 1942, and 5.6 percent over the 1932–1941 April average.

Butter, creamery, produced in the first four months of 1943 totaled 535,135,000 lb., an increase of 2 percent over the corresponding period of 1942, and 5 percent above the 1932–1941 average for the period.

Cheese, American, produced in April, 1943, was 66,740,000 lb., 24.9 percent below last year's record April production, but 65.5 percent over the 1932–1941 average for the month.

Cheese, American, produced during the first four months of 1943 totaled 218,265,000 lb., 25 percent below production for the corresponding period of 1943, but 67.8 percent above the 1932–1941 average for the period.

Evaporated milk production in April, 1943, totaled 285,509,000 lb., 20 percent below output in April, 1942, but 33 percent over the 1937–1941 April average.

Condensed milk, all kinds, produced in April, 1943, totaled 76,708,000 lb., compared to 70,874,000 lb. in April, 1942.

Milk, dried whole, produced in April, 1943, totaled 11,950,000 lb., up 178 percent over output in April, 1942, and 481 percent over the 1937–1941 April average.

Milk, dried skim, produced in April, 1943, totaled 47,500,000 lb., 23 percent below output in April, 1942, but 11 percent over the 1937–1942 April average.

Carrots canned in 1942 are reported as totaling 2,167,532 actual cases, all sizes, compared to 1,854,734, cases in 1941.

Salmon pack, total, for Pacific Coast and Alaska in 1942 is reported at 5,831,986 cases, compared to 7,831,629 cases in 1941.

Fruits, frozen, in storage on May 1, 1943, totaled 98,769,000 lb., compared to 101,810,000 lb. a year earlier and to an average in 1938–1942 of 86,215,000 lb. for the same date.

Vegetables, frozen, in storage May 1, 1943, totaled 62,076,000 lb., compared to 53,416,000 lb. a year earlier.

Butter, creamery, in storage on May 1, 1943, was 29,567,000 lb., compared to 37,228,000 lb. on May 1, 1942, and to an average of 31,116,000 lb. for the same date in 1938–1942.

Cheese, all kinds, in storage on the first of May this year totaled 79,719,000 lb. This compares to 208,171,000 lb. a year before and to an average in 1938–1942 of 109,412,000 lb. for the same date.

Eggs, case equivalent, in storage on May 1, 1943, totaled 10,803,000 cases. The figure on May 1, 1942, was 8,894,000 cases and the average for May 1 in 1938–1942 was 6,412,000 cases.

Poultry, all kinds, in frozen storage on May 1 of this year amounted to 33,242,000 lb., compared to 96,716,000 lb. on May 1, 1942, and to a May 1 average of 82,938,000 lb. in 1938–1942.

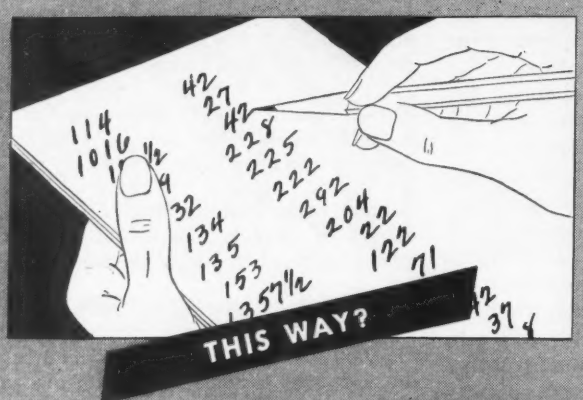
Meat, all kinds, in cure and frozen storage on May 1, 1943, totaled 712,289,000 lb. The amount on May 1, 1942, was 814,652,000 lb. and the average May 1 figure in 1938–1942 was 756,193,000 pounds.

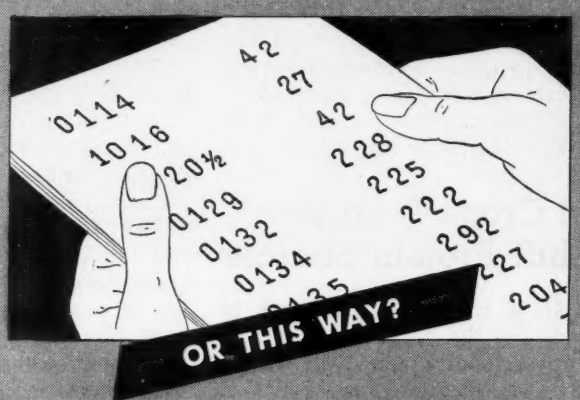
Lard in storage May 1, 1943, was 140,878,000 lb. and rendered pork fat on the same date totaled 7,564,000 lb. The combined figure for these two products a year earlier was 126,284,000 lb. and the average figure for 1938–1942 was 194,291,000 pounds.

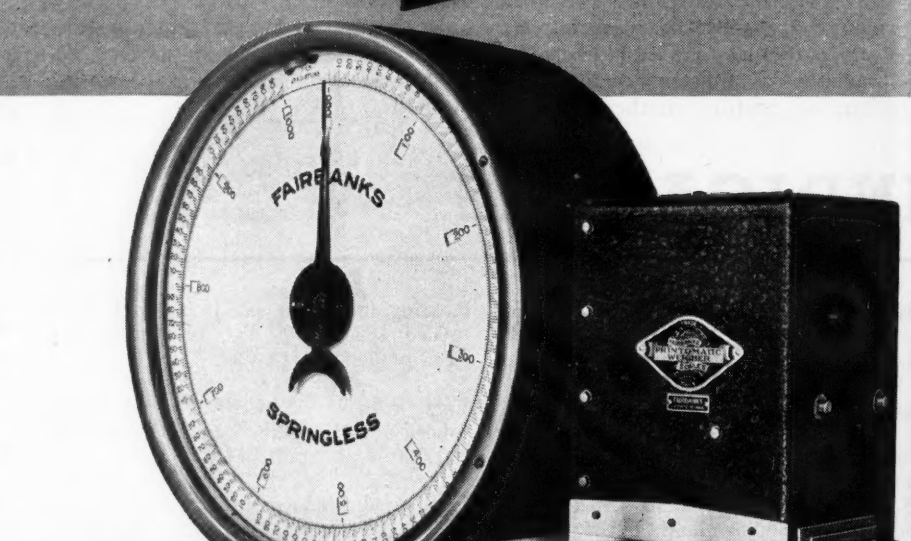
Weekly wholesale food price index of Dun & Bradstreet stood at $4.05 on June 8, 1943, compared to $4.10 on May 11, 1943 and to $3.66 for the corresponding week of 1942.

Business activity index of *Business Week* stood at 203.0 on June 5, 1943, compared to 204.4 a month earlier and to 181.6 a year previous.

How Are Weight Records Made In Your Plant—







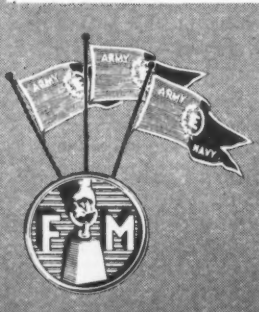
For precision weighing and precision recording use Fairbanks Scales with Printomatics

● Of course, *sustained accuracy* in the weighing machine is vitally important. But no matter how accurate the machine is, unless weights are *accurately recorded,* the element of error still remains.

Fairbanks Scales with Printomatics eliminate these human errors—because the scales read the weight automatically and then automatically make a *printed* record of the weight. In addition to eliminating errors, Fairbanks Scales can be fitted into your production flow to do a variety of jobs better than they can be done in any other way. Fairbanks Scales weigh loads in motion . . . count small parts . . . record the flow of liquid chemicals . . . guard secret formulas in compounding . . . control batching . . . automatically control ingredients . . . automatically control aggregates . . . and many other jobs.

The organization which made Fairbanks the greatest name in weighing brings you 113 years of scale manufacturing experience. That, too, is worth serious consideration.

Fairbanks, Morse & Co., 600 S. Michigan Avenue, Chicago, Illinois.



FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
GENERATORS
SCALES

WATER SYSTEMS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS
RAILROAD EQUIPMENT

FAIRBANKS SCALES

Scales

MEN • JOBS • COMPANIES

INDUSTRY

Andrus-Scofield Co., Columbus, Ohio, manufacturer of peanut butter and other food products, has purchased a new building in Columbus to replace the one recently destroyed by fire.

Bellows Falls Co-operative Locker Co., Inc., Montpelier, Vt., has been capitalized at $25,000 to operate a refrigerated food storage plant. The corporation will process and preserve, pack, store and ship meats, fish and poultry.

Broadway Roller Mills, Sanford, N. C., has purchased Seaboard Flour Mills, formerly owned by Sanford Milling Co.

Carolina Packing Co., Orangesburg, S. C., has become a division of Kingan & Co., Indianapolis, Ind., and will continue to operate with no change in personnel.

Chef Boiardi Food Products Co., Milton, Pa., Cudahy Packing Co.'s Omaha, Neb., plant and the Chicago plant of Wilson & Co., have been presented the Army-Navy "E" award for outstanding performance in production.

Co-operative Oil Products Association, Fresno, Calif., plans to expand its operations during the current season. The Fresno plant will bottle approximately 600,000 gal. of olive oil, and expects to increase its output to 1,000,000 gal. during 1944.

Lord Grain Co., Topeka, Kan., has recently purchased Nikles Soybean Mill, Inc., in Kansas City.

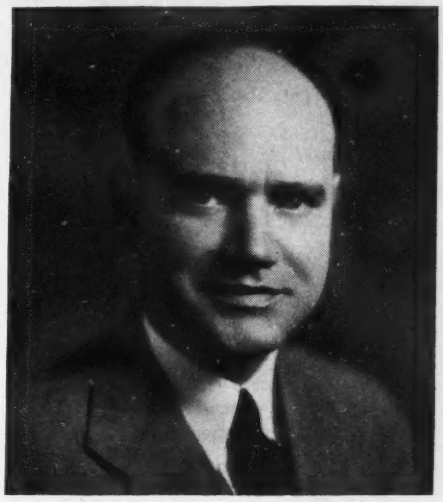
W. H. Malkin Co., Ltd., Vancouver, B. C., has recently packaged a product known as Half & Half—one-half pound of coffee and one-half pound of a coffee substitute. Each is packaged separately and the two are then bound together.

Monmouth Canning Co., Portland, Me., has been approved for the U. S. continuous inspection service of the U. S. Department of Agriculture. Acceptance of its four plants in Maine brings the list of plants operating under government service to 82.

Pepsi-Cola Co., Long Island City, N. Y., has elected Fred Sebulske, formerly manager of the Pepsi-Cola Bottling Co. of Pittsburgh, Pa., manager of all Pepsi-Cola company-owned bottling plants in the United States.

Portage Wholesale Co., Portage, Wis., has announced that it will install an egg drying plant in its warehouse for Army, Navy and Lend-Lease.

Sherman Food Processing Co., Sioux City, Iowa, is planning the erection of a $250,000 vegetable dehydration plant.



CHARLES S. BRIDGES

Libby, McNeill & Libby, Chicago, Ill., food canners, has announced the election of Charles S. Bridges to the office of vice-president in charge of sales, merchandising and advertising. Mr. Bridges succeeds Roy L. James, who has retired.

CLARENCE MARK

G. Washington Coffee Refining Co., Morris Plains, N. J., a subsidiary of American Home Products Corp., Jersey City, N. J., has elected Clarence Mark, formerly vice-president and general manager, to the presidency of the company.

Sugar Research Foundation, Inc., with temporary headquarters in New York, has been newly formed as a nonprofit organization to conduct research and distribute information regarding the place of sugar in the human diet. J. F. Abbott, president of American Sugar Refining Co., New York, has been elected president of the foundation.

JOHN GODSTON

Formerly sales promotion and advertising manager, and director of research in the food laboratories and testing bakery and consumer kitchen for American Molasses Co., New York, N. Y., John Godston is now devoting his full time as consultant for the New Foods Section of Food Distribution Administration. During the past 15 years he had been working on the development and uses of new products for the company and its eight subsidiaries.

Swift & Co. has announced the consolidation of its Detroit territory with that of Chicago, and the removal of the Detroit offices to Chicago.

Tasty Foods, Denver, Colo., has been awarded a $1,000,000 contract to dehydrate potatoes for Lend-Lease.

Washington Processors, Inc., has been organized at Wenatchee, Wash., with capital amounting to $50,000 to process and market dehydrated apples and other fruits and farm products.

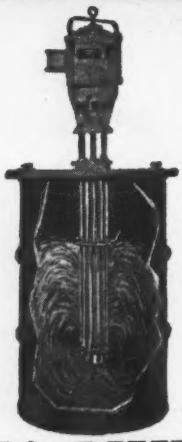
PERSONNEL

Bert Balart, formerly a member of OPA, has been appointed civilian coffee specialist of the Bakers and Cooks Section of the Subsistence Branch of the office of the Quartermaster General, Washington, D. C. Mr. Balart, who has had 47 years of experience in the coffee industry, will supervise the brewing of all coffee used in this country by the Army.

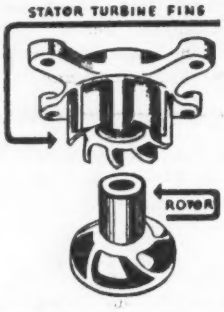
Daniel F. Bull has been reelected president, and G. V. Thompson, vice-president and treasurer, of Cream of Wheat Corp., Minneapolis, Minn.

Jean F. Carroll, formerly branch manager in charge of operations of 350 stores for Kroger Grocery & Baking Co.'s St. Louis area, has been appointed assistant director of the Food Rationing Division of OPA. Mr. Carroll has spent his business life in the food industry.

S-T-R-E-T-C-H
Man Hours



WITH
HOMO-MIXER'S
ADVANCED PRINCIPLE



INDUSTRY must win the race against time! But more than a great time-saver is the Eppenbach HOMO-MIXER. It's also engineered for finer diffusion.

Its principle is wholly different. There is no vortex, no air to affect the mixture. Only a fraction of the mass is worked at one time, creating more uniform dispersion. The material is rapidly forced up from the air-free bottom by the stationary turbine fins. With tremendous pressure and turbulence, the flow surges upward, outward and down. The entire batch completes this cycle in just a minute or two. No clamping to tank, no setting at angle, no vibration.

HOMO-MIXERS are doing a big job in process plants today — batteries up to a hundred! Write us!

EPPENBACH
INCORPORATED
Processing Equipment for Over 30 Years
44-02 11th STREET
LONG ISLAND CITY, N. Y.

JOHN H. KRAFT

Formerly executive vice-president and chairman of the executive committee, John H. Kraft has been elected president of Kraft Cheese Co., Chicago, Ill., succeeding his brother, J. L. Kraft, founder of the company, who becomes chairman of the board. John H. Kraft is director and member of the executive committee of National Dairy Products Corp. and is also president of National Cheese Institute.

Robert M. Davidson, president of Sanib Corp., New York manufacturers and importers of dehydrated banana products, has left for Puerto Cortes, Honduras, to supervise the installation of a new tunnel dehydrater in the company's modern dehydration plant. The new unit will double the plant's output of dried ripe bananas, raising it from 60,000 lb. to 120,000 lb. a month.

Dr. Carl R. Fellers, of the department of horticultural manufacturers at Massachusetts State College, is now in Australia in the Army, working on food coordination.

W. E. Gray, of the Pfaudler Co., Rochester, N. Y., has been made chairman of an additional special advisory subcommittee of the war problems committee of Dairy Industries Supply Association, Washington.

Albert Hacker has recently been appointed canning superintendent for Canned Food Products, Maspeth, N. Y.

Charles S. Hanes, who at present is serving with the British Food Mission in North America, has been appointed director of food investigation in the Department of Scientific and Industrial Research, Teddington, Middlesex, England.

Lamar Kishlar, director of research for Ralston Purina Co., St. Louis, Mo., has been elected president of American Oil Chemists Society.

William C. Launder has resigned as manager of the Brooklyn, N. Y., plant of R. U. Delapenha & Co., importer of food products, to become production manager of H. A. Johnson Co., Boston, Mass.

Joseph W. Montgomery has been named vice-president of Standard Fruit Co., New Orleans, La. He has been manager of the company's Southern division since 1938.

John H. Nair, 3rd, formerly of the research department of Swift & Co., Chicago, Ill., is now a member of the research department of Borden Co. in New York.

E. R. Paul becomes head of the glue and gelatine department of Swift & Co., Chicago, Ill., succeeding R. E. Cecill, who has retired after 42 years of service. Mr. Paul has been with Swift since 1923.

Harry Reed, veteran Department of Agriculture meat official and at present principal meat consultant to Chester Davis, food administrator, has been named chairman of the new War Meat Board with headquarters in Chicago. W. O. Fraser was appointed vice-chairman.

H. N. Riley, director in charge of research and quality control, and A. L. Schiel, director and assistant to the president, have been elected vice-presidents of H. J. Heinz & Co., Pittsburgh, Pa. N. G. Woodside, who has been with Heinz for 57 years, recently retired from his position as director and vice-president of the company.

REPLACES FOUR TRUCKS AND DRIVERS

The Freuhauf trailer and truck combination shown here replaces four trucks and four drivers and has proved itself so efficient that the Dairy Co-operative Association has placed a second similar unit in service. The unit hauls milk to the Portland market from Trout Lake and Hood River, Ore., receiving stations, carrying 4,600 gal.

DEATHS

Albert G. Bixler, 85, vice-president and director of National Biscuit Co., New York, May 26, in New Rochelle, N. Y. Mr. Bixler had been in the baking industry since 1881.

George E. T. Dey, 60, sales executive of Loose-Wiles Biscuit Co., Long Island City, N. Y., recently, in New York.

Samuel W. Hallstrom, 52, Chicago candy manufacturer and an official of the National Confectioners Association for the last four years, June 12, in Los Angeles, Calif.

Clyde T. Hays, 64, secretary-treasurer and director of Beatrice Creamery Co., Chicago, Ill., recently, in Chicago.

W. R. Motherwell, 88, former Dominion Minister of Agriculture, and popularly known as the father of the cooperative movement among agrarians, recently, in Regina, Saskatchewan, Canada.

Col. Gustave Pabst, 76, former president of Pabst Brewing Co., Milwaukee, Wis., May 30, in Oconomowac, Wis.

C. Mason Tucker, chief chemist and factory manager of Joseph Burnett Co., Boston, Mass., June 9, in Boston.

ASSOCIATED INDUSTRIES

Alloy Steel Products Co., Inc., and the Warner's plant of American Cyanamid Co., both in Linden, N. J.; Wright's Automatic Machinery Co., Durham, N. C.; and Consolidated Packaging Machinery Corp., Buffalo, N. Y., have been awarded the Army-Navy "E" award for outstanding performance in war work. Builders Iron Foundry of Builders-Providence, Inc., Providence, R. I., and the Mt. Pleasant, Tenn., plant of Victor Chemical Works have been presented an additional white star which signifies winning the pennant for the second time.

Arabol Manufacturing Co., New York manufacturer of adhesives, has announced the appointment of William A. Weaver to the position of president of the organization, succeeding the late Henry Kohler. Mr. Weaver, who was formerly treasurer of the company, also becomes a director of Arabol.

Carrier Corp., Syracuse, N. Y., has set up a new war production board to formulate and carry out a variety of plans and programs that will further Carrier's contribution to the war effort. The board, which replaces the company's war production drive committee, has members selected from various departments and organization levels.

Stecher-Traung Lithograph Corp., of Rochester, N. Y., and San Francisco, Calif., has advanced Leslie H. Jackson from executive vice-president to the presidency of the company, succeeding Louis Traung, who becomes chairman of the board.

WHY USE A SUBSTITUTE WHEN

CORK

IS AVAILABLE

Cork has been provided by nature with a remarkable cellular structure which gives it special advantages as an insulator. Above, raw cork is stripped from the cork oak before shipment to our factories for fabrication into insulation products.

Because of indispensable services, cork was under priority control for nearly two years while America prepared its arsenal. Now with sufficient stocks of cork accumulated to insure vital uses, with fresh shipments arriving regularly, cork is available for all commercial applications—without priority. • The unique qualities in cork that caused it to be reserved for essential uses, and that have long made it the standard of comparison, recommend its use wherever low temperature must be controlled. • When you buy Mundet Cork Insulation, you buy insulation *service*, lasting and dependable: conservation of low temperature, minimum upkeep and maintenance. In walls, floors, ceilings; in tanks and in pipelines Mundet Cork Insulation is a natural barrier to heat flow—sure protection for all low-temperature purposes. • Mundet offices in principal cities offer responsible direction, including complete installation.

Mundet Cork Corporation, Insulation Division, 65 South Eleventh Street, Brooklyn, N. Y.

MUNDET

CORK INSULATION

For over 58 years the biggest job of Patapar* Vegetable Parchment has been packaging and protecting foods. War needs resulted in a new appreciation of what this remarkable paper can do, and today Patapar has many important war assignments. Most of them cannot be talked about, but here are a few examples:

In manufacturing of gas masks
In manufacture of Plexiglass
Mold liners
Ration C wrappers
Map tracing papers
Ointment box liners
Snuff box liners
Special photographic purposes
Liners for coffee bags
Bulk shortening packaging units
Liners for motor oil containers

Some of the ways Patapar can help you

Wrappers for butter, meats, fish, cheese, lard, shortening, ice cream, vegetables, dried fruits, frozen foods

Milk can gaskets

Milk bottle hoods

Bulk packaging units

Packaging coffee and tea

Patapar is grease-resisting, insoluble, boil-proof. These basic characteristics have been a vital aid in solving difficult problems. Used alone as a wrapper Patapar meets exacting requirements. And with the addition of special treatments, or when used in combination with other materials it can do jobs never before thought possible for paper.

Today, operating at peak capacity, we require more time to process orders. So if you have a special job for Patapar we suggest you let us know your requirements as far in advance as possible.

*Reg. U. S. Pat. Off.

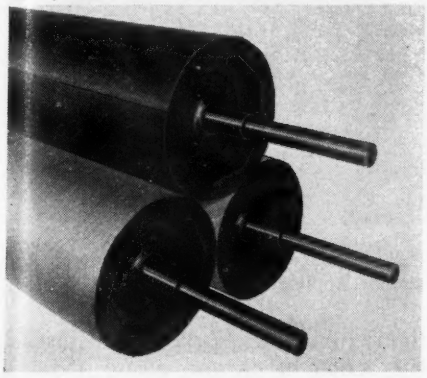
Paterson Parchment Paper Company • Bristol, Pennsylvania

WEST COAST PLANT: 340 BRYANT STREET, SAN FRANCISCO, CALIFORNIA
BRANCH OFFICES: 120 BROADWAY, NEW YORK • 111 WEST WASHINGTON STREET, CHICAGO

FOOD EQUIPMENT NEWS

Wood Stave Rolls

RODNEY HUNT MACHINE CO., Orange, Mass., has brought out special lightweight low cost wood rolls to serve in place of rolls made of restricted metals. The accompanying illustration shows one size of these rolls—12 in. diameter by 88 in. face—although they are available in any diameter from 12 in. up. In the illustration, the two lower rolls are covered with a spiral wound webbing in order to provide greater pull.



Light weight wood rolls as substitute for metal rolls.

To save weight and reduce cost, the usual cast-iron spiders are replaced with a series of wood heads. These in turn are anchored securely to the through shaft by means of a special patented construction.

Tomato Scalder

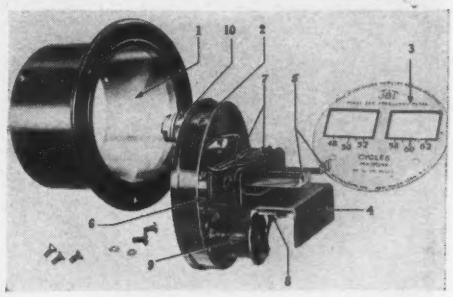
F. H. LANGENSKAMP CO., Indianapolis, Ind., has brought out an improved design of tomato scalder for canning plants. While the basic method of operation and handling routine of the older model have been retained, improvements have been made with the aim of increasing capacity and reducing operating costs. Dead water space has been eliminated, reducing the volume of water required for efficient scalding and also reducing the steam needed to maintain the water at the correct temperature. A new temperature control is provided that will act upon one degree of change in the water temperature, assuring a uniform, correct working temperature. The bulb of the thermometer is placed in the inner tank, directly below the conveying chain, where it registers the temperature of the water at the point of the scalding operation.

The conveying unit in this scalder is arranged so that it can be lifted out of the tank, as shown in the illustration. This permits easy cleaning of the tank, and also can serve to prevent over-scalding of tomatoes in the tank if the peeling belt is not operating for any length of time. The grid at the receiving end of the conveyor is fastened with hinges and so arranged that it cannot be raised beyond a 45 degree angle. This grid prevents tomatoes from rolling off the conveyor when it is lifted out of the tank. Doors as wide as the conveyor are provided. These doors, and baffles in the corners of the tank, make it easy to flush out all seeds and sediment.

Frequency Meter

J-B-T INSTRUMENTS, INC., New Haven, Conn., is manufacturing a vibrating reed type frequency meter for use on engine-generator sets, in laboratories, in electronic operations, on panel and control boards, and for various other applications. The meter consists of a case *1*, base 2, dial 3, central mounting frame *4*, series of spring steel reeds *5*, reed mounting bar *6*, an individual driving coil *7*, surrounding each bank of reeds, a permanent magnet 8, a series resistor 9, and terminal studs *10* (the numbers refer to the accompanying illustration).

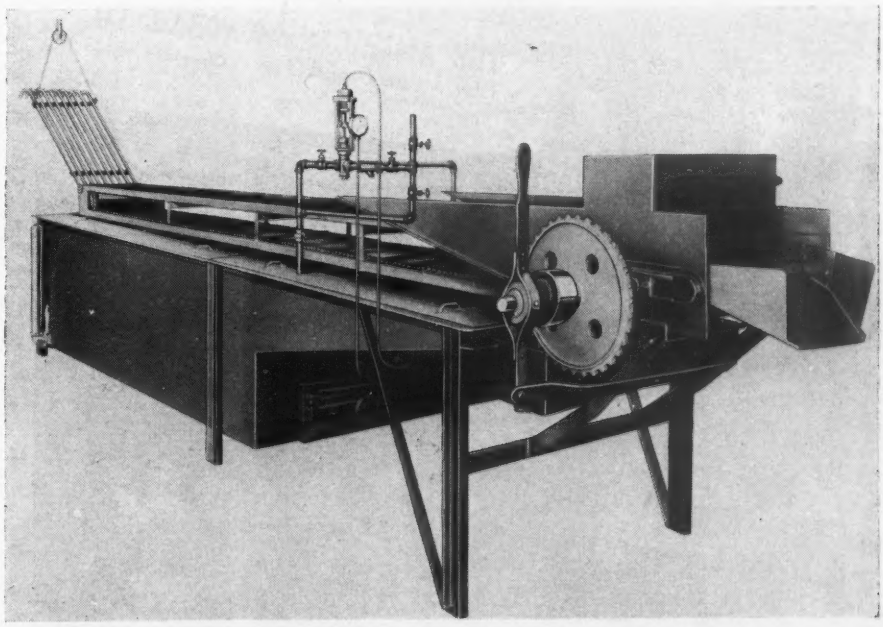
In operation, the alternating current, or interrupted direct current, excites the driving coil. As each reed is adjusted to respond by resonance to but one frequency, the one reed



Unassembled view of frequency meter.

"in tune" with the frequency in the coils will respond by vibrating rapidly because of polarization by the permanent magnet and induced magnetism from the coil. A series resistor adopts the instrument to specified operating voltage. The frequency of the current can be read, opposite the vibrating reed, on the dial. If the frequency is fractional—say 60.5 cycles—the 60 cycle reed and the 61 cycle reed will each vibrate to about one-half full amplitude.

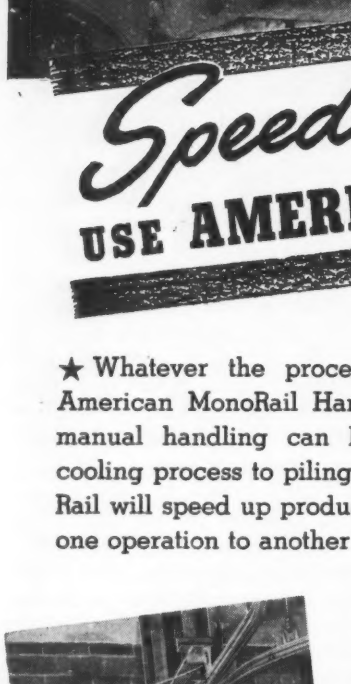
External vibrations have little affect on operation. No mechanical adjustments are needed in service. Other advantages claimed include: The instrument is not affected by the wave form, nor by normal temperature changes, nor by external magnetic fields. The instrument has an accuracy plus or minus 0.3 percent on full cycle increments and plus or minus 0.2 percent on half cycle increments. It can be supplied for frequencies from 20 to 425, with lower or higher ranges for special services.



Tomato scalder with conveyor lifted out of tank

Speed up PROCESS—
USE AMERICAN MONORAIL

★ Whatever the process — it can be speeded up with American MonoRail Handling Equipment. A great deal of manual handling can be eliminated. From cooking and cooling process to piling of finished goods, American MonoRail will speed up production by rapid, careful transfer from one operation to another. Available for manual, automatic or electric operation. Let an American MonoRail Engineer show you the possibilities of eliminating production delays and reducing handling cost. Write today.



THE AMERICAN MONORAIL CO.
13125 Athens Avenue Cleveland, Ohio
★

New Type Gasket

A SPONGE rubber gasket, covered with a smooth coating of natural rubber or synthetic rubber by an extrusion process has been developed by B. F. Goodrich Co., Akron, Ohio. At present, these gaskets are made only for use in military products, but after the war they are expected to find wide application for cold room doors and other products. When coated with synthetic rubber, the gasket will withstand the action of oil and grease and will also withstand extremely low temperatures. While this product is said to have a much lower permanent set than a tubular type gasket, it is also said to be as soft and pliable. The product is available in round, square and rectangular shapes and in sizes from ¼ to 1½ inch.

New gasket for refrigerator doors and similar applications.

Device Turns Evaporated Milk Cases

A SIMPLE new mechanical device for turning over cases of canned evaporated milk by the pallet, or platform, load of twenty cases or more at a time to replace the laborious method of turning over only one case at a time by hand has been developed by Colonel Charles E. Stafford, QMC, Commanding Officer at the Mira Loma, California, Quartermaster Depot, the War Department reports.

To prevent evaporated milk in storage from clabbering or the solids in the milk from settling to the bottom of the cans, it must be turned over at intervals of thirty to sixty days. Up to now no suitable machinery has been developed for the purpose, and in instances where large quantities of evaporated milk are in storage, turning the stock by hand requires a substantial amount of time and labor.

Most Quartermaster Corps warehouses store their cased goods on pallets. These are small slotted platforms

which can be handled by a fork-lift elevator truck. The forks of the elevator device are designed to fit into the slots of the pallet, which can then be raised or lowered by the truck and moved into the warehouse stacks or into a car for shipment.

The Stafford turner was designed with a view to handling twenty cases at one time by employing a lift-truck to remove the pallet load from the stacks, place it in the turner, and replace it in the stacks after the turning process is completed.

The turner, designed for warehouse use, consists of a heavy cylinder of wood with a square opening in the center large enough to hold a pallet load of cases. The cylinder is mounted on two rollers which permit it to be rotated on a horizontal axis.

In operation, the lift-truck takes a pallet load of cases from the stack and the operator places another pallet on top of the cases. The pallet load, with the additional pallet on top, is then placed in the turner with both pallets against the left side of the square opening. The turner is then turned by hand in a counter-clockwise direction until the load is reversed, the extra pallet placed on top of the load at the beginning of the operation now serving as the bottom pallet. The load is then removed and returned to the stacks, the cases undamaged, the milk turned and perhaps shaken up a little in the operation but safe from clabbering.

Dust Collector

A PORTABLE dust collector known as the "Safe-Aire" has been developed by the Bargar Sheet Steel Co., c/o Ralph Maitland, 435 Penton Building, Cleveland, Ohio. This equipment can be used to supplement permanently installed dust collecting systems, or in place of such

Portable dust collector.

Save Time in VITAMIN A Determinations

with the Beckman Spectrophotometer

...Workers have indicated the ultraviolet absorption to be a more reliable index of Vitamin A content than antimony trichloride reaction with its attendant complications.
—Wilkie: U. S. Food & Drug Admin.

The Beckman Spectrophotometer has already proved itself to be the fastest, simplest, and most accurate method for Vitamin A determinations. And, because the Beckman Instrument covers not only the visible and near ultraviolet, *but the complete range of ultraviolet* down to 220 mmu—this is the *only* spectrophotometer capable of handling ALL types of modern vitamin determination and control work!

Step up the speed, accuracy, and convenience of *your* vitamin work with the BECKMAN Spectrophotometer—the one spectrophotometer with *full range* to cover all present day vitamin work as well as future developments in this field!

Important Features of the Beckman Spectrophotometer

▶ **Entirely Self-Contained:** The monochromator, light sources, phototubes, and electrical measuring circuit are all incorporated within the instrument to insure maximum convenience, ruggedness, and accuracy.

▶ **Easy to Operate:** Measurements are quick and simple to make. Direct readings in both % Transmission and Density can be made *simultaneously*.

▶ **Remarkably Versatile:** Interchangeable light sources, interchangeable phototubes, a monochromator with full range (220 mmu in the ultraviolet to 1000 mmu in the infrared) enable the instrument to meet all the varying requirements of research and control work with no sacrifice in convenience or accuracy.

▶ **Highly Accurate:** Although unusually simple to operate and remarkably versatile, the instrument is extremely accurate over the full scale, even with low light intensities. Stray light effects are less than 1/10 of 1% over most of spectral range.

▶ **Ruggedly Built:** Optical parts are rigidly mounted in a massive heat-treated iron block, within a hermetically sealed metal case. All parts are designed for long life and sustained accuracy.

Send for complete information on the Beckman Spectrophotometer. Describe the application you have in mind and our experienced engineering staff will gladly make helpful suggestions on the use of this instrument in *your* work.

NATIONAL TECHNICAL LABORATORIES, South Pasadena, Calif.
Beckman Instrument Division

Beckman INSTRUMENTS SPEED PRODUCTION ...REDUCE WASTE

WAREHOUSES BUILT... WHILE YOU WATCH

BACK comes a lever, up goes a load! Twenty bags, 2000 pounds, are neatly stacked to the girders almost as fast as you can say "Towmotor frequently doubles warehouse capacity."

That's only part of the picture. On this same installation, one man and a Towmotor move 12 tons of bagged salt 150 feet and load it on a truck . . . *in 24 minutes!*

Find out how you can save time, manpower, space and money with a "Towmotored" materials handling system. Details are outlined in our new manual, "The Inside Story." For your free copy write Towmotor Corporation, 1222 E. 152nd Street, Cleveland, Ohio.

TOWMOTOR

THE 24-HOUR ONE-MAN-GANG

systems. Its basic use is to collect dust from a single machine. The capacity is 600 cu.ft. per minute. In operation, it returns the cleaned air to the work room, 97 percent clean and slightly warmer than before. In some instances, this gives advantage in space heating.

The dust collector is powered by a ⅓ hp. motor, which operates an Ilg blower at 3,400 r.p.m. It is 37 in. high, 27 in. wide and 13 in. deep.

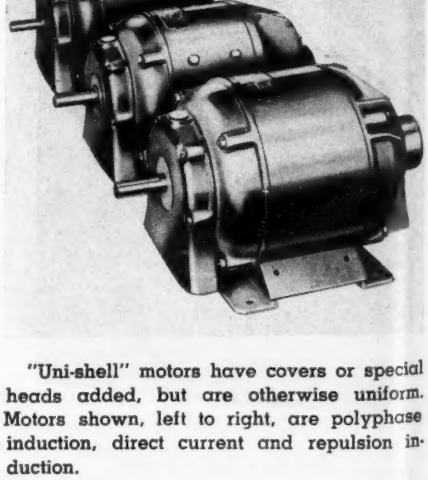
Plastic Badges

IDENTIFICATION BADGES for workers, made entirely of plastic, are being produced by Royal Emblem Co., 41 John St., New York. Called "Plasticseal," this badge is made entirely of non-critical materials and is said to be light in weight, thin, durable and strong. It is claimed that it keeps its shape, is tamper-proof and has no sharp edges. It is made in two parts, a reinforced plastic case and a crystal or face, fitted over the photograph tightly when assembled. After assembly, it is stated that in order to tamper with the badge it is necessary to so mutilate it that it becomes unusable.

New Line of Motors

ROBBINS & MYERS, INC., Springfield, Ohio, has announced a new line of "Uni-Shell" motors, a line in which all motor types in any one frame size are interchangeable. All motors in this line are built within cylindrical shells of steel. In any one frame size, the shell dimensions, head fit, bolt circle holes, shaft size and conduit box mountings are identical for all motor types. This is true of polyphase induction motors, capacitor start induction motors, standard d.c. motors and generators, repulsion induction motors, as well as other types.

Other improvements claimed for this

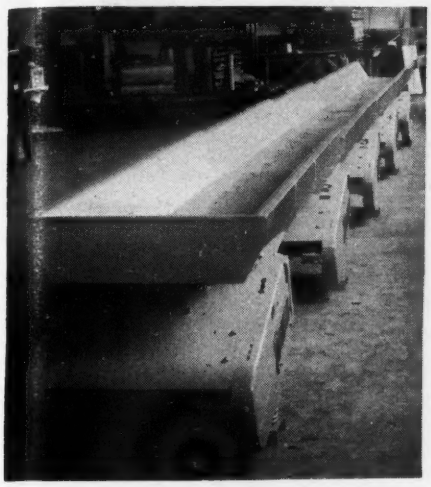


"Uni-shell" motors have covers or special heads added, but are otherwise uniform. Motors shown, left to right, are polyphase induction, direct current and repulsion induction.

new line of motors include: Improved bearings of both ball and sleeve types, with improved lubrication; better insulation; construction that prevents vibration and thus prolongs bearing life; dirt and splash proof design.

Vibratory Conveyor

SYNTRON Co., 460 Lexington Ave., Homer City, Pa., has developed a line of long vibratory conveyors in various styles and capacities. In these, the



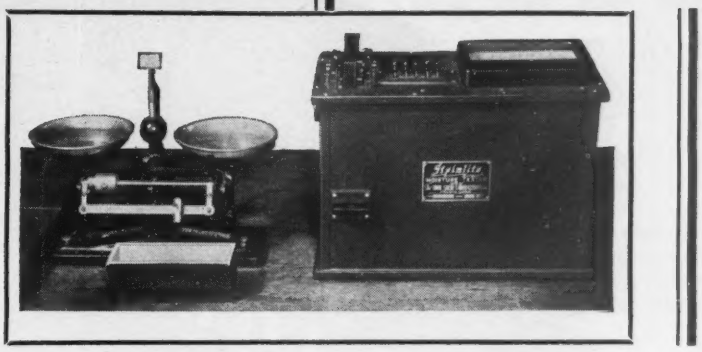
Vibratory conveyor, showing a 35 ft. section of a 130 ft. unit.

conveying action is accomplished by high speed vibration set up by multiple, pulsating driving magnets. There are no mechanical moving parts. Control of the rate of flow of material is by rheostat installed at some convenient point or is automatic, as desired. Conveyor trough styles can be flat pan, as shown in the accompanying illustration, or sealed tubular sections with intakes and discharges located to suit.

Advantages claimed for this conveyor include absence of abrasion of material conveyed, sensitive control of rate of flow, also ability to handle fine materials without dust and protection of conveyed material from exposure when using tubular troughs. The driving magnets are either below the troughs, as illustrated, or above for clearance, and can be either floor mounted or cable suspended from above.

Plastic Tubing

EXTRUDED PLASTICS, INC., Norwalk, Conn., has brought out its "Tulox" type TT seamless plastic tubing in all diameters up to 2 in. outside diameter. This range of sizes will soon be increased to 2½ in. outside diameter. The tubing is extruded from cellulose acetate butyrate made by Tennessee Eastman Corp. and is available from warehouse stocks through Crane Co., Chicago, and Julius Blum & Co., Inc., New York.



Steinlite One Minute Moisture Tester Used by the Beechnut Packing Company.

Beechnut Packing Company Uses the STEINLITE

to test moisture in dehydrated foods

Beechnut uses the Steinlite to check the moisture content at various stages in dehydrating carrots and other foods. The speed of the Steinlite makes it ideal for this purpose. Complete tests are made in about one minute.

93 food dehydrators use the Steinlite . . . and over 3,000 firms in the grain and seed industries.

The STEINLITE works on the radio frequency impedance principle. The Steinlite is accurate because it is built by a staff of radio laboratory technicians and is calibrated against official U. S. Government Vacuum oven method.

It is easy to use because after the sample is placed in the test cell, the operator need only press a button, read the meter and compare the reading with a conversion chart.

It is cheap to operate. In all, it consumes no more electricity than a 60 watt bulb.

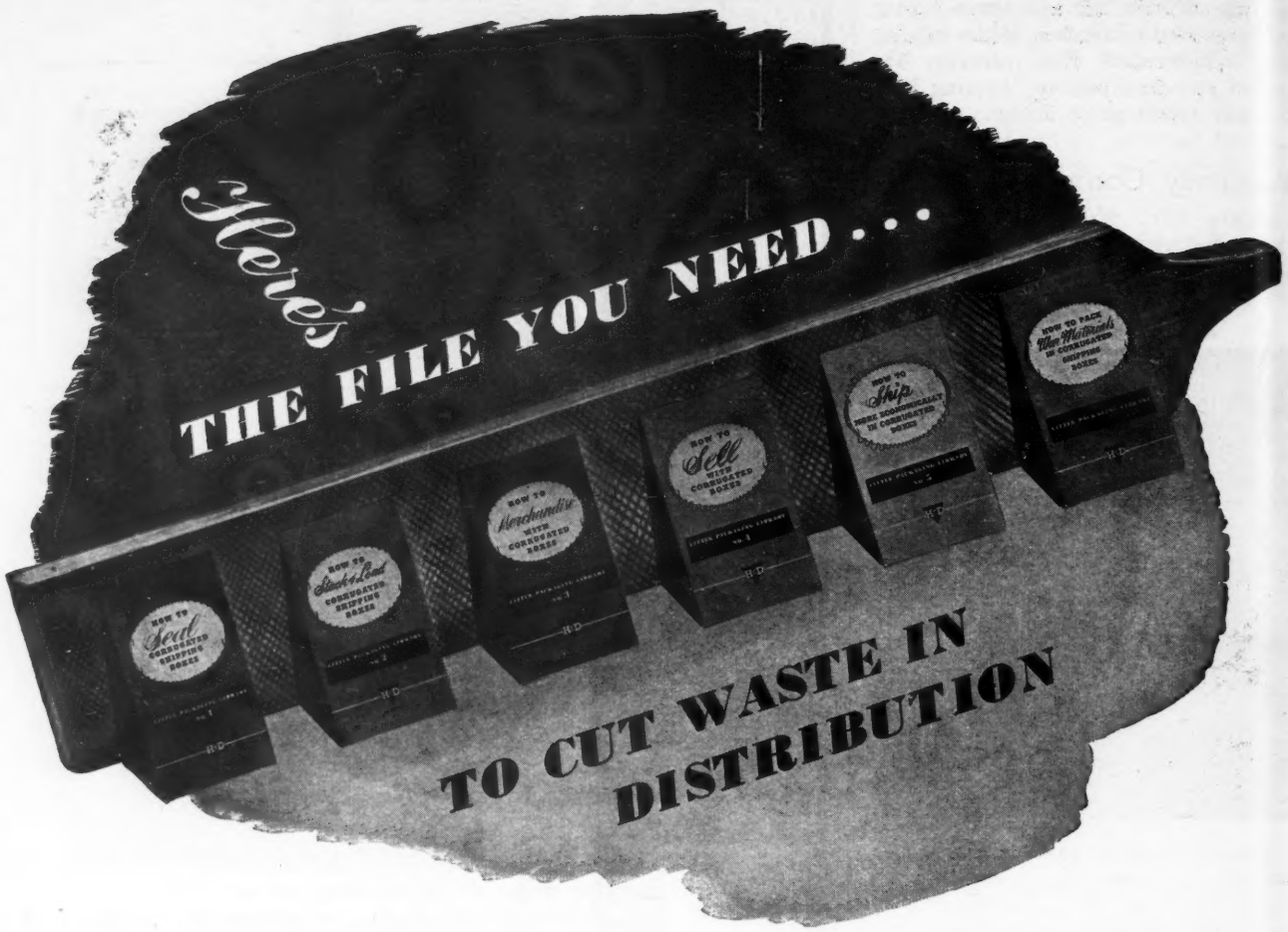
The STEINLITE is used widely in the production control of dehydrating eggs, meat, fish, fruits, vegetables, soup and cereals. For further information about the STEINLITE, write today.

"HEADQUARTERS" for Moisture Testers—Broad Line of Testing Equipment.

SEEDBURO EQUIPMENT COMPANY

Seedburo Quality — Formerly Seed Trade Reporting Bureau — Founded 1912

634 BROOKS BLDG. CHICAGO, ILL.


Here's
THE FILE YOU NEED . . .
TO CUT WASTE IN DISTRIBUTION
How to Seal Corrugated Shipping Boxes
How to Stack & Load Corrugated Shipping Boxes
How to Merchandise with Corrugated Boxes
How to Sell with Corrugated Boxes
How to Ship Most Economically in Corrugated Boxes
How to Pack Machinery in Corrugated Shipping Boxes

IT'S HANDY . . . it's helpful . . . it has dozens of applications in hundreds of businesses. It will help you smooth out rough spots in packing, shipping and distribution, give you an edge in efficiency.

There's no time like the present to make use of this tool. The enormous load being carried by the railroads means inevitable waste of materials, machinery, manpower and transportation facilities. That waste can be curtailed only if every manufacturer takes immediate steps to improve shipping methods.

The first step is to send for this complete file of packaging "text-booklets." Every man in your organization who is concerned with shipping and distribution will find this "refresher course" in packaging a definite aid in locating and correcting many of his problems. Write for as many sets as you need . . . they're yours for the asking, FREE, without obligation.

Protect the Product

BETTER SEE H&D AUTHORITY ON PACKAGING

HINDE & DAUCH Executive Offices: 4309 Decatur Street, Sandusky, Ohio

FACTORIES in Baltimore • Boston • Buffalo • Chicago • Cleveland • Detroit • Gloucester, N. J. Hoboken • Kansas City • Lenoir, N. C. • Montreal • Richmond • St. Louis • Sandusky, Ohio • Toronto

JUST OFF THE PRESS

BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Dehydrating Equipment—The Moore reversible cross-circulation dehydrater is concisely described in a brief factual folder, Bulletin 4304, which sets forth important features of the dehydrater, including reversible air travel, automatic zone control and flexible operation; issued by Moore Dry Kiln Co., Jacksonville, Fla.

Food Processing Equipment—Specifications, capacities, dimensions and weights of various types of standard glass-lined steel and stainless steel mixing, heating and cooling equipment are given in a 20-page illustrated booklet, Bulletin 819, issued by Pfaudler Co., 89 East Ave., Rochester, N. Y.

Grinding Equipment—The dual operation of maceration and continuous separation in food processing performed by the Enterprise vertical mill is concisely described in a 4-page bulletin, No. 9, published by Enterprise Engine & Foundry Co., Process Machinery Division, 18th & Florida Sts., San Francisco, Calif.

Heat Transfer Equipment—"Manual of Welded Steel Tubing for Heat Exchanger and Condenser Use," a 20-page catalog which furnishes illustrated descriptions of the welded-tube manufacturing process, fabricating data and tables of properties, has been published by Formed Steel Tube Institute, 1621 Euclid Ave., Cleveland, Ohio.

Materials Handling Equipment—Specifications and photographs of various types of Weld-Bilt two- and four-wheel trucks, steel-frame tilt trucks, trailer, wagon and package trucks are given in a 34-page catalog, No. 1042, issued by West Bend Equipment Corp., West Bend, Wis.

Processing Equipment—A new condensed catalog of equipment for temperature and humidity control, refrigeration, heating and ventilating, has been put out by Carrier Corp., Syracuse, N. Y.

PLANT SUPPLIES

Blowers and Exhausters—A 20-page illustrated bulletin, No. 120-B-12, describing through diagrams and photographs the construction and operating characteristics of single and multi-stage centrifugal blowers and exhausters, has been issued by Roots-Connersville Blower Corp., Connersville, Ind.

Gaskets—The first of a new series of technical bulletins, describing the testing methods used to determine factors in gasket engineering, including photomicrographic illustrations, graphs and tables, has been issued by Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Fans— Construction features, installation, maintenance, dimension charts, specifications and capacity tables relating to acid resistant "Heavy Duty High Temperature Fans," are given in a 12-page bulletin, No. 78, published by Despatch Oven Co., Minneapolis, Minn.

Fire Extinguishers—The care and use of five types of fire extinguishers, and their application to several kinds of fires, are discussed in the booklet "Maintenance of First Aid Fire-Fighting Equipment," issued by American-La France-Foamite Corp., Elmira, N. Y.

Motor Drive—Mot-O-Trol, an electronic adjustable-speed drive which provides a wide, stepless range of speeds, automatic speed regulation and smooth, fast acceleration with automatic current limitation, is described in a new 4-page booklet, B3256, published by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Oil-Retaining Bearings—"Compo Oil-Retaining Porous Bronze Bearings," is the title of an 8-page illustrated bulletin on machine bearings issued by Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.

Paints—To meet the various maintenance problems existing in food plants, special paints highly resistant to rust, dampness and corrosion are briefly described in the 4-page folder, "Wilbur & Williams Penetrating Protective Paints," issued by Wilbur & Williams Co., Park Square Bldg., Boston, Mass.

Pulley Lagging—As a means of conserving both power and conveyor belts, Circular No. 13, explaining methods of applying "Grip-on," a pile-face surface pulley lagging, has been published by Victor Balata & Textile Belting Co., Easton, Pa.

Pumps—Positive-displacement gas pumps, covering a pressure range up to 6 lb. and a capacity range from 5 to 600 cu. ft. per minute, are described and illustrated in the 6-page Bulletin 31-B-15 issued by Roots-Connersville Blower Corp., Connersville, Ind.

Pump Shafts and Rods—Four different methods for reconditioning worn pump shafts and rods are described and illustrated in an 8-page booklet put out by International Nickel Co., Inc., 67 Wall St., New York, N. Y.

Surface Condensers—Structural and design features, steam penetration, air removal equipment and cross-flow condensers, as well as typical condenser installations, are described and illustrated in a 36-page technical bulletin, Form 9327, published by Ingersoll-Rand Co., 11 Broadway, New York.

Tank Linings—A list of industrial chemicals to which Koroseal sheet linings are resistant is given in a brief folder, Catalog Section 9028, issued by B. F. Goodrich Co., Akron, Ohio.

CONTROL EQUIPMENT

Control Equipment—An 8-page bulletin, No. A112, describing five types of a new line of "Convertible Free-Vane Air-Operated Controllers," has been published by The Bristol Co., Waterbury, Conn.

Control Instruments—Two standard type TDC time-delay relays are illustrated in a folder, Bulletin 800, giving construction details, applications, housing dimensions and time scale and price lists; issued by R. W. Cramer Co., Inc., Centerbrook, Conn.

Control Instruments—A 40-page catalog, No. 1200, entitled "Tag Indicating and Recording Controllers for Temperature and Pressure," describing and illustrating by photographs the installation, operation and application of three types of pressure spring controllers has been issued by C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y.

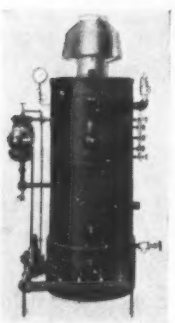
MISCELLANEOUS

Maintaining Equipment—"Handbook for the Welding and Cutting Operator" is the title of a 20-page pocket-size booklet containing helpful information and suggestions on the care and maintenance of blowpipes, regulators, and welding and cutting accessories; published by International Acetylene Association, 30 E. 42 St., New York.

Service Manual—A 28-page bulletin containing complete service and repair part information on ovens for operators of large and small bakeries, has been published under the title, "Comprehensive Service and Repair Manual for Roasting and Bakery Ovens," by G. S. Blodgett Co., Inc., Oven Department, 53 Maple St., Burlington, Vt. Cleaning and adjustment methods and repair parts lists are included.

Synthetic Rubber—A 40-page catalog, briefly tracing the development of synthetic rubber, and fully describing the physical and chemical properties of natural rubber and of five types of synthetic rubber, has been published under the title, "The Five Commercial Types of Synthetic Rubber," by United States Rubber Co., Synthetic Division, 1230 Sixth Ave., New York.

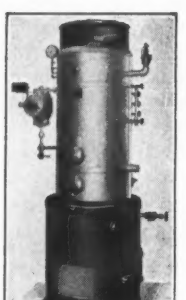
accurately controlled
STEAM
for
• DEHYDRATING
• BLANCHING
• COOKING, etc. . . .
is readily provided by



KANE
automatic
gas-fired
BOILERS
Sizes 1 to 30 H.P. for pressures up to 100 lbs. (higher pressures to order.) Patented automatic gas controls. Jacketed.

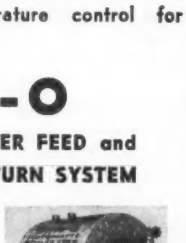
or

MKAYO
BOILERS
for oil or
stoker firing
Sizes 2½ to 30 H.P. Pressures to 100 lbs. (higher pressures to order.)



Whether used independently or as "boosters", the sensitive controls and efficient steam-generating construction of these boilers make possible precise temperature control for critical processing.

M-K-O
AUTOMATIC BOILER FEED and
CONDENSATE RETURN SYSTEM
Eliminates feed water worries . . . returns hot condensate and pumps feed water against high boiler pressure . . . helps maintain constant steam pressure . . . saves fuel.



MEARS-KANE-O'NEILL
Manufacturers of Automatic Steam Boilers
for over a third of a century.
1903-1915 EAST HAGERT STREET, PHILADELPHIA 25, PA.

BOOKS

Facts About Food Sales

FACTS IN FOOD AND GROCERY DISTRIBUTION. Published by Progressive Grocer, 161 Sixth Ave., New York, N. Y., 1943. 23 pages; 8x11 in.; paper. Free.

Here is a concise compilation of basic information and statistics in food distribution as of January, 1943. In the first ten pages is outlined the changes taking place in food stores while the industry is adjusting to war conditions.

One of the highlights is the fact that the number of retail food stores declined by more than 33,000 in 1942, this number including 21,000 independent grocery and combination stores, 3,500 chain stores and 9,000 single-line specialty stores.

Other interesting facts are that the merchants curtailed services everywhere, employed 50 percent more women and showed an increase of 25 percent in sales per full-time employee. Independent grocery and combination store sales increased $1,210,000,000 in 1942 for a total of $7,600,000,000. Chain grocery and combination sales increased $780,000,000 for a total of $4,600,000,000. Specialty food store sales increased $510,000,000 for a total of $3,100,000,000. All food store sales were up $2,500,000,000 for a total of $15,300,000,000, the highest on record.

The statistics also show that retail prices averaged 17 percent higher in 1942 than in the previous year and that self-service stores continued to expand, especially among the medium-size stores.

These data, and the many other facts in the folder, will be useful to food company sales executives in formulating their policies.

Emulsion Work Book

PRACTICAL EMULSIONS. By H. Bennett. Published by Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y., 1943. 462 pages; 6x9 in.; cloth. Price, $5.

Written to provide practical facts for those dealing with emulsions, this book is unique, in that it begins where theoretical texts on colloid chemistry leave off. The work touches only lightly on the theoretical aspects and concentrates on the art of making and applying emulsions.

Since the author covers emulsions in general, only parts of the work are of direct concern to the food industries. In this category is the basic information in Part I and the chapters in Part II on formulas for emulsifying agents, cleaners and soaps, defoaming agents, food emulsions and agricultural spray emulsions. Part I gives useful information about emulsifying agents, types of emulsions and foams, methods, formulation and equipment, stability, general technical emulsions and dispersing and wetting agents. Also given are lists of emulsifying agents, emulsions and demulsifying and defoaming agents.

Alcoholic-Beverage Guide

GROSSMAN'S GUIDE TO WINES, SPIRITS AND BEER. By Harold J. Grossman. Published by Charles Scribner's Sons, 597 Fifth Ave., New York, N. Y., 1943. 404 pages; 7x9½ in.; cloth. Price, $3.75.

There is little information in this book that would add to the manufacturer's technical knowledge of the alcoholic-beverage industry, since the author presents his material principally for the distributor and connoisseur. But it will widen the processor general knowledge of his industry.

There are chapters on wines processed in European countries and several of those manufactured here. The book describes the products, their general method of production, sale, care and use. Beers, ales and distilled spirits are also discussed.

The guide, a reprint of the 1940 edition, was written before wartime changes in the industry occurred, but a new preface comments on these changes.

Heating, Cooling Handbook

HEATING, VENTILATING AND AIR CONDITIONING GUIDE, 1943. Published by American Society of Heating and Ventilating Engineers, 51 Madison Ave., New York, N. Y., 1,160 pages; 6½x9¼ in.; cloth. Price, $5.50 with thumb index.

Published annually by the American Society of Heating and Ventilating Engineers, this work is a combination handbook and manufacturer's catalog. The handbook part contains 872 pages of explanatory matter, tables and charts of practical value to engineers concerned with heating, ventilating, air conditioning and refrigeration. As with other technical handbooks, the treatment is so advanced and concise that it is of use only to engineers trained in the theory.

The handbook is divided into seven sections: Principles; heating and cooling load calculations; combustion and consumption of fuels; steam and hot water heating; air heating, cooling and conditioning; automatic controls, instruments and motors; and special applications and miscellaneous (including drying systems).

Questions & Answers

Refining Corn Oil

Kansas—"We have given some thought here to the refining of corn oil which we get from our expellers. We are interested in knowing the process of refining."

The crude expeller oil is filtered through a filter press, then treated with a caustic solution to which two percent of soda ash has been added. The quantity of soda and the solution strength must be determined by laboratory test, for the particular oil to be treated. The soda ash is added to give a firmer soap stock and reduce entrainment of the oil. The oil is separated from the soap stock by centrifuging.

Further treatment is similar to that for edible oil from cottonseed. The oil is bleached by heating at just over 100 deg. C. until all the water is removed, then is agitated with about 2 to 6 percent fuller's earth for a short time. Before shipping, the bleached oil is deodorized.

There are many types of deodorizers. The process consists of a steam distillation under vacuum, which should be as high as possible. The oil is heated to about 200 to 225 deg. C., usually by means of heating coils in the tank. Superheated steam is passed through it from a perforated coil in the bottom. Vacuum should be maintained during heating, steaming and cooling, to avoid injury to the heated oil by contact with the air. The time of treatment varies, being shorter the better the vacuum. The product should be light colored and almost tasteless.

The finished oil is "wintered" by holding at a low temperature until the wax has separated.

Onion Weeding

New York—"In your February issue, on page 48, we note, under the heading 'Hors d'Oeuvres,' the item about weeding of onions by the application of flames. In case it would be possible for you to inform us where we could find the original literature on the matter, we would be greatly obliged."

Our source of information on this is the *Pacific Rural Press*, published on the West Coast. The information which this paper presented is brief, but we shall give you the highlights of it:

This onion weeder was devised by an Oregon onion grower and is recommended to growers by C. B. Gentry Co., dehydrators of onions and other vegetables. The weeder burns off weeds and the tops of the young onions. The deep-planted onions come up again, but the weeds are mostly destroyed.

The flame is applied in tapered sheet-metal tunnels dragged behind a tractor at a speed of one mile per hour, and four parallel tunnels weed four rows of onions at a time. The tunnels are each about 5 ft. long, approximately 8 in. high and 8 in. wide at the front end where the flame enters. The flame, which passes backward through the tunnels, is generated by commercial fire guns. The machine is said to be easy to make.

Fruit Juice Treatment

Mexico—"We intend to make tomato and pineapple juice, to be packed in glass containers. We want to get from you information as to how to avoid settling in those juices after bottling. We mention that we have a complete line of tomato and pineapple juice machinery. Please tell us if a colloid mill will give good results in this case."

To avoid settling in the tomato juice, the colloid mill will probably give good results. Most manufacturers use a homogenizer for tomato juice.

Pineapple juice will not respond to this treatment. To make a clear juice, we suggest filtering the juice after heating, in order to remove any suspended matter. However, even though it will not prevent settling, a colloid mill or a homogenizer will put a cloudy juice in condition so that it can easily be remixed.

Asparagus Soup

California (by wire)—"Referred to you concerning asparagus soup formulas to save food. Can you help us?"

In January, 1936, we published an article by Lloyd A. Hall which seems to offer a possible answer to this problem. Mr. Hall found that asparagus butts could be dehydrated in a cabinet dryer at 125 deg. F. for 4 hours. The wet butts were sliced thin before being put on the trays. The dried product was ground and made into a soup mix using 20 percent processed corn flour, 4.5 percent salt, 0.5 percent white pepper and 75 percent of the dehydrated asparagus. The mixture was used on the basis of 2 lb. to 2 gal. of water, and made a very good asparagus soup. The dried butts stored in airtight containers over a period of 6 months gave no indications of decomposition or loss in flavor.

This information was supplied immediately by wire.

BETTER POTATO CHIPS

o Push-Button Control is only one phase of the facts about the

FERRY CONTINUOUS POTATO-CHIP MACHINES

It is easily adjusted to give you just the kind of potato chips which your best trade demands —whether it be brown or light color, thick or thin chips, or any of the variations in between.

Then, this quality and size of chip are maintained steadily, without change.

Every stage in the process of preparing, cooking and finishing is automatic.

Made in six sizes, capacities from 50 to 350 lbs. of finished chips per hour.

Write for complete information. Ask for Bulletin F-I.

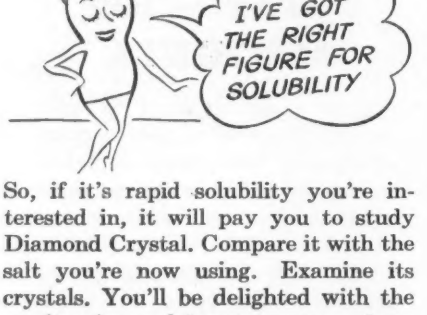
J. D. FERRY CO.
129 SO. CAMERON ST.
HARRISBURG, PA.

Also makers of
SLICERS & AUTOMATIC SLICERS
FEEDERS AND CAN WASHING MACHINERY

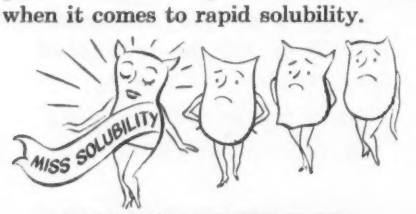
WE'VE AN EYE FOR "FIGURES"

WHO WINS the beauty contest? The lovely with the best figure. For she's the one the judges pick, when a bevy of pretty girls passes in review. Which just proves that the right kind of figure always makes a hit . . . that shape is often the measure of success.

Take the salt business, for example. Just as our super-glamour gal's figure is "different," you'll find the shape of an Alberger crystal different. For only Diamond Crystal is *flash crystallized*—crystals caused to grow much more rapidly. As a result, Diamond Crystal Alberger flakes have maximum specific surface. And any chemist or food technologist knows that the solubility rate of salt depends on specific surface more than anything else.



So, if it's rapid solubility you're interested in, it will pay you to study Diamond Crystal. Compare it with the salt you're now using. Examine its crystals. You'll be delighted with the results of your laboratory comparison, and equally pleased when you follow up with actual plant tests. Yes, a trial will convince you that the *right shape* puts Diamond Crystal out in front when it comes to rapid solubility.



NEED HELP? HERE IT IS!

If you have a salt problem, write to Technical Director, Diamond Crystal, Dept. J-7, St. Clair, Michigan. We'll be glad to advise you—or even send an experienced salt technician to your plant—without obligation to you.

DIAMOND CRYSTAL
ALBERGER PROCESS **SALT**

PATENTS

Finely Divided Material Stabilized for Storage by Treatment With Inert Gas to Replace Oxygen-containing Air—Gerald D. Arnold, Wauwatosa, Wis. No. 2,318,576. May 11, 1943.

Milk Packaged in Glass Bottle Designed to Have Drip-controlling Neck—Bruce A. Jackson, Oakland, Calif. No. 2,318,611. May 11, 1943.

Foods Processed in Plate Freezer Equipped With Mechanical Device to Give Layer Distribution Over Refrigerated Plate Surface—Clarence Birdseye, Gloucester, Mass., to Mechanical Research, Inc., Providence, R. I. No. 2,318,736. May 11, 1943.

Provitamin A Extract Prepared From Palm Oil—Loran O. Buxton, to National Oil Products Co., Harrison, N. J. No. 2,318,747. May 11, 1943.

Fats and Oils Treated For Separation of Unsaponifiable Fraction and Its Refinement—Loran O. Buxton, Belleville, N. J., and Eric J. Simons, New York, N. J., to National Oil Products Co., Harrison, N. J. No. 2,318,748. May 11, 1943.

Fats and Oils Treated for Recovery of Unsaponifiable Fraction—Loran O. Buxton and Howard B. Colman, Belleville, N. J., to National Oil Products Co., Harrison, N. J. No. 2,318,749. May 11, 1943.

Grapes Stemmed by Mechanical Means—Frank C. Silva, San Jose, Calif. No. 2,318,805. May 11, 1943.

Acid Vegetable Juice Made From Expressed Vegetable Juices by Two-stage Lactic Acid Fermentation—John G. Souther, Alameda, Calif., to Schwarz Engineering Co., Inc., San Francisco, Calif. No. 2,318,810. May 11, 1943.

Foods Preserved from Oxidative Deterioration by Treatment With Alkali Hydride in Presence of Water for Liberation of Active Hydrogen—Felix Kiefer, Beechhurst, N. Y. No. 2,318,867. May 11, 1943.

Food Materials Cut Into Dice-like Cubes by Plurality of Rotary Slicing Knives With Tapered Edges—Albert R. Thompson, Los Gatos, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,318,904. May 11, 1943.

Shell Pieces Containing Nut Kernels Separated From Mass of Cracked Nuts by Mechanical Means—Le Roy L. Stevens, Los Angeles, Calif., to California Walnut Growers Association. 2,318,976. May 11, 1943.

Wheat Given Heat Treatment Prior to Milling to Offset Damage to Baking Character by "Wheat Bug"—Charles Robert Jones and Arthur Goodyear Simpson, Saint Albans, England, to The Research Association of British Flour Millers, London, England. No. 2,318,999. May 11, 1943.

Oxidizable Juices Filled Into Open-top Containers Under Protective Blanket of Inert Gas—Ronald B. McKinnis, to McKinnis Foods, Winter Haven, Fla. No. 2,319,075. May 11, 1943.

Fruits Segmented and Pitted by Mechanical Means—Oral S. Fix, to Polk Development Co., Tampa, Fla. No. 2,319,120. May 11, 1943.

Skim Milk Powder Mixed With Skim Milk Completely Digested With Proteolytic Enzyme to Form Human Dietary Product—James D. Ingle, to Industrial Patents Corp., Chicago, Ill. No. 2,319,186. May 11, 1943.

Cheese Processed by Addition of Emulsifying Agent, Ammonium Metaphosphate, Diammonium Disodium Pyrophosphate, or Mixtures, and Heat-treating With Agitation to Pasteurizing Temperature—James D. Ingle, to Industrial Patents Corp., Chicago, Ill. No. 2,319,187. May 11, 1943.

Whole Milk Powder Made to Contain Sugar and Glucose to Amount of From 30 to 70 Percent by Weight of Total Finished Mix and Approximately 2 Percent Moisture—Otto John Wouters, Zwolle, Netherlands, to Alien Property Custodian. No. 2,319,362. May 18, 1943.

Canned Foods Agitated by Rotation of During Passage Through Heat-treating Chamber in Tubular Carrier in End-to-end Relation—Alex R. Kennedy, deceased, to Indiana Condensed Milk Co., Indianapolis, Ind. No. 2,319,505. May 18, 1943.

Foods Cooked in Continuous Manner During Mechanical Movement Through Heated Oil Vat—Walter R. Scharach, Stockton, Calif., to Cogrisch Products, Inc. No. 2,319,561. May 18, 1943.

Anhydrous Alpha Lactose Made to Maintain Stable Crystalline Structure Under Ordinary Room Temperatures at Relative Humidity of 50 Percent—Paul Francis Sharp to Cornell Research Foundation, Inc., Ithaca, N. Y. No. 2,319,562. May 18, 1943.

Molasses Heated Close to Point of Caramelization and Distributed Into Mix by Spraying in Atomized State—Theron W. Black, Columbus, Wis., to Benjamin H. Card, Fairwater, Wis. No. 2,319,579. May 18, 1943.

Waxy Maize Starch Mixed With Dilute Acid Solution at Temperature Not to Exceed 140 Deg. F. to Give Product of Thin-bodied Properties and of High Adhesive Strength—Herman H. Schopmeyer and George E. Felton, Hammond, Ind., to American Maize-Products Co. No. 2,319,637. May 18, 1943.

Crystallized Dextrose Made From Substantially Completely Converted Corn Starch—James F. Walsh, Yonkers, N. Y., and James Dudicker, Hammond, Ind., to American Maize-Products Co. No. 2,319,648. May 18, 1943.

Refined Sirup Made by Converting Starch With Warm Dilute Solution of Sulphuric Acid, Treating With Lime to pH of Approximately 3.5 to 5, Separating Coagulated and Precipitated Materials, Treating Clarified Liquor to Remove Acid Preparatory to Concentrating and Decolorizing—James F. Walsh, Yonkers, N. Y., to American Maize-Products Co. No. 2,319,649. May 18, 1943.

Canadian Patents

Foods Nutritionally Fortified by Addition of Yeast Mixed With Iron Phytate—John S. Andrews, St. Paul, and Lacey H. Evans and Louis H. Huber, Minneapolis, Minn., to General Mills, Inc. No. 412,274. May 4, 1943.

Fish Heads and Livers Combined With Ground Tomatoes and Green Vegetation for Use in Poultry and Animal Feeding—Mary Frith Ransford. Stevenson, B. C., to H. Bell-Irving and Co., Ltd., Vancouver, B. C. No. 412,389. May 11, 1943.

Milk Adjusted to pH of Between 6.2 and 5.8 Preliminary to Cheese Manufacture—William O. Beers, Chicago, Ill., to Kraft Cheese, Ltd., Montreal, Quebec. No. 412,448. May 11, 1943.

Molasses Treated by Diluting, Heating Under Pressure, Aerating, Permitting Impurities to Settle, and Decanting of Supernatant Molasses—William H. Bührig, Mount Vernon, N. Y., and Henry M. Harff, Wilmette, Ill., to Standard Brands, Inc., New York, N. Y. No. 412,464. May 11, 1943.

Vitamin-bearing Tissues of Fresh Fish Protected Against Bacterial Decomposition by Sprinkling With Dry Alkali Metal Carbonate to Give pH in Excess of 9.0—Robert Henry Bedford, Monterey, Calif. No. 412,505. May 18, 1943.

Dry Powdered Soup Base Made to Consist of Monosodium Glutamate and Thickening Agent Containing Flavoring Ingredient and Coloring Matter—Gustavus John Esselen, Swampscott, Mass. No. 412,511. May 18, 1943.

Flavoring Sirup Material Distributed Through Mass of Partially Frozen Confection to Give Variegated Product—Harry R. Howser, Washington, D. C. No. 412,520. May 18, 1943.

Milk-protein Gel Dessert Made to Contain 10 to 20 Parts by Weight of Dry Powdered Milk, 3 to 10 Parts by Weight of Lactone and 20 to 40 Parts by Weight of Sugar, Plus Flavoring and Coloring Ingredients—Louis J. Huber and Lacey H. Evans, to General Mills, Inc., Minneapolis, Minn. No. 412,596. May 18, 1943.

Manual of Detergents and Cleaning Practices

(*Continued from page 80*)

movers are not to be recommended for any general cleaning practice.

EXAMPLES: *Oakite Milkstone Remover, DuCleen, Wyandotte S.R.-5, gluconic acid, Magnus K-Solv, Magnus D-Scale-R, Mikro-San No. 1029-1, hydroxyacetic acid.*

Acid Cleaners. Heretofore acid compounds have been unacceptable as dairy cleaners because of their inferior detergency and their relatively intense corrosive action.

Newly developed acid cleaners have, however, overcome these disadvantages because: (1) They are compounded with relatively low-corrosive acids. (2) They contain corrosion inhibitors which prevent the formation of corrosive substances when used with water predisposed to their formation. (3) They have greatly enhanced cleaning properties because of their wetting agent components. (4) They provide an incidental water treatment both corrective and curative of waterstone-milkstone formation. (5) They prevent the growth of quality defective bacteria, yeasts and molds. (6) They provide for a final rinse of cleaned equipment which rapidly drains and leaves a dry, relatively germ-free and thoroughly degreased surface whose acid reaction prevents ready recontamination of such cleansed surfaces.

Because of their cost, acid cleaners should be used as a spray in cleaning equipment, and for dependable results, manufacturers' directions should be carefully followed.

EXAMPLES: *Mikro-San, Mikro-Stat.*

Part II of this article, in August, will discuss wetting agents, polyphosphate and abrasives.—The Editors.

Wartime Problems Discussed by IFT

(*Continued from page 63*)

Prof. B. E. Proctor recounted the experience so far in packaging dehydrated foods by compression. He pointed out that, in this process, rehydration must be kept in mind and the blocks of food must not be compressed so hard that they cannot be readily broken up when used. Also, it is necessary to compress without fragmentation, so that the proportion of fines in the rehydrated food is not increased. With many foods, a pretreatment such as heating is necessary before compression in order to prevent fragmentation. Also,

KS *Engineered Equipment**

Reduces Drying Time 50% In a Well-Known Food Plant

The problem here was how to improve the drying of a product and do it in less time—in order to remove a serious bottleneck in production. In winter months when atmospheric air was relatively dry, the product moved from process to process smoothly and continuously. However, with the advent of warm weather and higher humidity, production was thrown out of mesh by a greatly increased time required for drying.

When Kerby Saunders was called in on the case the average drying time was 6 days. A careful study of the situation revealed the steps to be taken which involved the means and provision for using more air as well as better air distribution. After installation of K.S. Equipment, the time for drying was reduced to 3 days (a saving of 50%) and a better, more uniform product resulted. A further feature was provision for precise automatic control of the whole system — an advantage greatly appreciated by those charged with the operation. Quicker loading and unloading were also realized. Capacity was actually increased.

* How KS *Engineered Equipment* can help you, too

If you have any problem whatsoever involving air conditioning, drying, dehydrating or refrigeration, consult Kerby Saunders. This organization specializes on the design and construction of plants where these processes are employed. Our engineers are prepared to save you valuable time and money in solving problems already existing or in assisting you in installing the equipment and methods best suited to meet your requirements.

MULTI-STAGE DEHYDRATION AIR-CONDITIONING REFRIGERATION

Kerby Saunders, Inc.

ENGINEERS AND CONTRACTORS

330 West 42nd Street, New York City

Takes On All Comers

The Wyandotte Service Man stands ready to take on all comers . . . to meet any challenge. Whether your cleaning problem is simple or difficult, old or new, he has the trained know-how, based on Wyandotte's many years of research and experience, to *solve* it.

Food's war role today is heroically out-size . . . involving incredible square miles of storing and shipping space, of new techniques for de-bulking, de-hydrating, powdering, capsulizing, canning. With it all, new techniques in mass cleaning methods must keep pace, tailored to the demands of great dairies, canneries, huge plants, mammoth storage warehouses.

That's where Wyandotte comes in! Through its laboratories, production experts, and on-the-spot corps of service representatives, Wyandotte has the answer for every problem . . . from as elementary a one as washing dishes by hand or machine . . . to a *new* process for cleaning materials or equipment on the most lavish scale.

Write Wyandotte today for detailed information on any phase of food equipment cleaning . . . or call in a Wyandotte Service Man.

Wyandotte

SERVICE REPRESENTATIVES IN 88 CITIES

WYANDOTTE CHEMICALS CORPORATION
J. B. FORD DIVISION WYANDOTTE, MICHIGAN

Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and The J. B. Ford Company to better serve the nation's war and post-war needs.

the type of press has an influence on the amount of fragmentation. The mechanical press, which is the fastest, is suitable only for powdered foods, while the hydraulic press is recommended for other foods. Fatty materials must be compressed at low pressure unless prechilled to avoid expression of fats. Some materials are compressed into 4 lb. blocks, 4x8 in. in areas, with the thickness depending upon the material. Development of pressing into granules permits 30 lb. of potato to be packaged into a can that will only hold 15 lb .of potato dice.

Food Processes

Several papers presented at the meeting discussed food processes that have been developed or revived because of the war. H. S. Bailey, Orange Products Co., described the production of concentrated fruit juices (for description of this process see FOOD INDUSTRIES, May, 1943, page 62, and June, 1943, page 64). Clarence Birdseye, General Foods Corp., stated that the war had advanced the acceptance of quick frozen foods by five years, particularly as the process permitted packaging without much scarce material and also saved much shipping and storage space. He also called attention to the beginnings made in the quick freezing of cooked foods and forecast a promising future for these products. Pickling was represented on the program by a paper on problems in sauerkraut manufacture by Carl S. Pederson, New York State Agricultural Experiment Station; and the brine preservation of vegetables was discussed by J. L. Etchells and M. A. Hoffman, Bureau of Agricultural and Industrial Chemistry and I. D. Jones, North Carolina Agricultural Experiment Station (see FOOD INDUSTRIES, May, 1943, page 65). This brining method was used on a number of vegetables and with dry salt, dissolved salt and salt solution with added acetic acid. Tests showed the product, after varying storage periods, to be satisfactory in flavor and color.

Research Papers

A good part of the program was devoted to contributions detailing the results of original researches into various phases of food technology. These included studies of the "Rehydration of Dried Fruits and Vegetables," by Martha E. Davis and Louis B. Howard, Western Regional Research Laboratory; "Moisture Determination in Dehydrated Foods," by Benjamin Makower, Western Regional Research Laboratory; "Control of Fat Deterioration," by G. E. Holm, Bureau of Dairy Industry; "Control of Enzymatic Action in Foods," by A. K. Balls, Bureau of Agricultural and Industrial Chemistry;

"Tartrate Recovery from Winery Wastes," by George Marsh, University of California; "Wine Grape Seed Oil," by W. V. Cruess and Cyril Marx, University of California; "Seasonings, Their Effect on Maintenance of Quality in Storage of Frozen Ground Pork and Beef," by C. W. DuBois and D. K. Tressler, New York State Agricultural Experiment Station; and "Retention of Vitamins in Dehydrated Vegetables During Storage," by C. L. Beardsley, R. F. Prindle and H. P. Stevens, American Can Co.

Appert Medal

At the annual dinner of the Institute, the 1943 Nicholas Appert Medal for achievement in food technology was presented to Professor S. C. Prescott, of Massachusetts Institute of Technology, who is past-president of the IFT. The presentation was made by M. E. Parker, chairman of the Chicago Section of the Institute.

New Officers

At the business session of the Institute, the following officers were elected to serve for the calendar year 1944: President, W. V. Cruess; vice-president, F. C. Blanck; secretary-treasurer, G. J. Hucker; councillor-at-large, R. C. Sherwood. Councillors-at-large elected to serve for two years, 1944–45, were: L. V. Burton, F. W. Tanner, H. R. Kraybill, P. F. Sharp and G. A. Fitzgerald.

This Is What It Costs To Dehydrate Vegetables

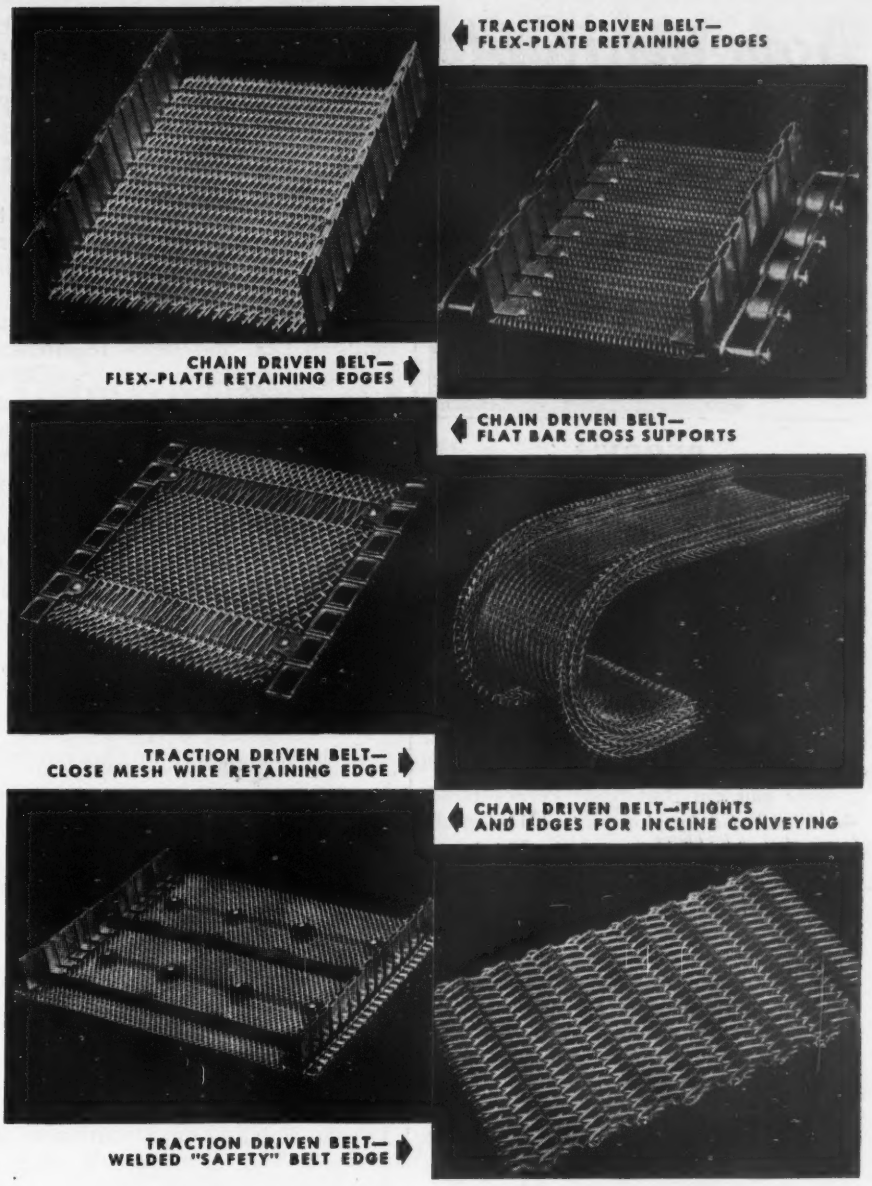
(*Continued from page 71*)

cannot possibly include all items. Even a plant that has been completely engineered before construction may present the owner with "additional cost" items before it is finished. Conditions vary throughout the country, and these variations materially affect any attempt to arrive at generalizations regarding costs.

Handling Capacities and Utility Requirements

The capacities per unit of time at various points along the processing line of a 50-ton plant are shown in Table IV. Data are given for seven vegetables important in the dehydration program. Such tables are of assistance in estimating labor requirements and equipment sizes for each operation.

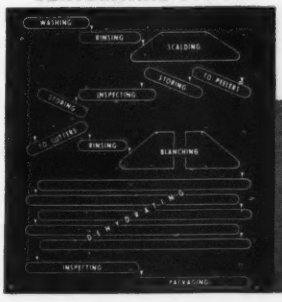
Facilities must be available to provide approximately the quantities of heat, power and water indicated in Table V. The figures in this table allow for the differences in consumption of utilities under various operating con-



IDEAS FOR THE DESIGN OF DEHYDRATING PLANTS

In all but the smallest units, continuous dehydrators cost less to build and operate than batch dehydrators of the same drying capacity. (Food Industries, Oct. 1942, Page 45). . . . If you have, or are planning to use a continuous dehydrator, why not eliminate all the production bottlenecks of batch processing with a complete "continuous dehydrating plant." Every production step from the harvested vegetable to the packaged product can be a smooth, continuous flow on Audubon "Metalwove" Belts. Labor in loading and unloading is eliminated in this modern "trayless" system, for each belt is gravity "self-loading." Belt speeds can be easily synchronized and adjusted to the production desired or the processing-time requirements of the product being dehydrated. . . . A few of the numerous types of Metalwove Belts are pictured above; however, our engineers will gladly assist you in selecting the ones best suited for every job in your plant, whether it be existing, pilot, or contemplated. Catalog on request.

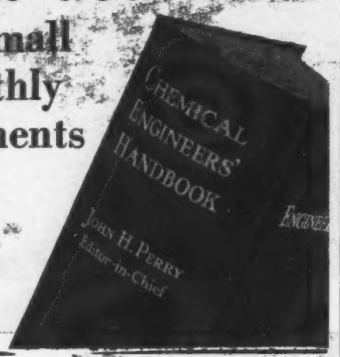
AUDUBON CONTINUOUS DEHYDRATING SYSTEM



AUDUBON
WIRE CLOTH CORPORATION
Subsidiary of Manganese Steel Forge Co.
2807 Castor Ave • Philadelphia • Pa.
Representatives in Most Principal Cities

Now available

on small monthly payments



SEE IT 10 DAYS FREE

PERRY'S

CHEMICAL ENGINEERS' HANDBOOK

Prepared by a Staff of Specialists

Editor-in-Chief, John H. Perry
E. I. du Pont de Nemours & Co.

2nd edition, 3029 pages, 1300 illustrations, 1000 tables, $10.00

Now you can start using Perry's Handbook at once—paying in small monthly installments while you use it. No strings to the offer—no mark-up to cover installment charges—no difference in quality of the book. Just a special offer to urge action. Whether you are a practicing engineer, executive, plant or laboratory worker, or mechanical engineer—no matter what your questions—whether directly concerned with unit operations, or afield in such subjects as Plant Location or Fire Protections—you are sure to find it answered here, concisely explained and illustrated, authoritatively handled by a specialist and instantly accessible.

A complete chemical engineering library in one volume

- **1030 pages of mathematical, physical and chemical fundamentals**
- **1060 pages of data and practice on unit processes**
- **740 pages of important engineering information**
- **129 pages on related business and professional subjects**
- **70-page quick-reference index**

10 DAYS FREE EXAMINATION

SEND THIS COUPON

McGRAW-HILL BOOK CO., INC.
330 W. 42nd Street, New York City

Send me Perry's Chemical Engineers' Handbook for 10 days' examination on approval. In 10 days I will send $1.00, plus few cents postage, and $3.00 monthly for three months thereafter, or return book postpaid. (Postage paid on orders accompanied by remittance of first installment.)

Name .....

Address .....

City and State .....

Position .....

Company .....Food 7-43

ditions. The indicated demand load for electric power is really total connected load. The average operating load will usually be smaller. The quantity of heat required varies widely with different methods of air heating and changes from one vegetable to another. The necessary size of the steam plant, even on the same operating procedure, varies with the boiler efficiency and the care exercised in avoiding steam waste. The lower limits of heat and steam requirements for the dehydrater are considerably higher than the actual operating usage for some vegetables under good operating conditions. They allow an adequate margin of safety to permit full capacity operation of the plant at all times, even under bad atmospheric conditions. Many dehydrators will not find it necessary to have such a large amount of surplus heating capacity.

New Vacuum Process Aids Waste Disposal

(*Continued from page 89*)

moved as sludge was about 1:1. In the case of asparagus, it was 1:3.5. Results of suspended solids tests on these various materials are given in Table II.

These tests were run at a 9-in. Hg vacuum for 3 minutes after aerating by agitation for 30 seconds, as these conditions were indicated to be optimum.

Pilot-Plant Tests

To determine the effectiveness of vacuum flotation on a continuous flow basis, a 7-ft. diameter Vacuator was constructed and tested out on sewage at the Los Angeles Terminal Island plant and on oil waste at a West Coast refinery. This pilot plant unit is shown in Fig. 5. Operation of this unit resulted in the establishment of basic factors used in the design of the commercial unit as shown previously in Fig. 2.

Average results of the Terminal Island tests are shown graphically in Fig. 6. During this test period the sewage contained a considerable amount of industrial waste. Occasionally a large amount of fish wastes was present.

These data show that a relatively high percentage of the light suspended solids was floated even at very high overflow rates and low detention periods. At an overflow rate of 5,000 gal. per square foot per 24 hours, the total theoretical detention period in the Vacuator was 6.7 minutes. Results were measurably improved with diffused air as against no preaeration.

Of special interest was the high percentage of solids in the float which contained 4.2 to 8.4 percent of solids. Observations showed a complete absence of scum when the Vacuator effluent was post-settled.

Plant Installations

Commercial Vacuator units built to date range in size from 4.5 to 40 ft. in diameter. For cannery waste treatment these units are rated at 5,000 gal. per square foot per 24 hours, i.e., a 20-ft. diameter unit (707 sq. ft.) would be capable of treating 3.5 million gallons of waste water per day.

Preliminary tests on an 18-ft. diameter unit at a West Coast cannery gave the following results: Raw waste 1,660 p.p.m. of suspended solids, vacuator effluent 330 p.p.m.; percent removal 80.

Tomatoes and spinach were being packed when this test was made. The flow rate was 1,252 gal. per minute, giving an overflow rate of 7,100 gal. per square foot per 24 hours and an overall theoretical detention period of 15 minutes. The actual detention figured to the lower end of the effluent baffle was only 7 minutes.

The vacuum flotation process should serve to provide adequate enough treatment of fruit and vegetable cannery wastes so that these wastes may be discharged to a municipal sewer system or to a receiving body of water. In the case of fish cannery and meat packing wastes it will provide a satisfactory method of pretreatment ahead of chemical precipitation or biological oxidation. Chemical treatment may be used in conjunction with the Vacuator to provide adequate treatment even for these difficult-to-treat wastes.

Mechanical Treatment Destroys Insects

(*Continued from page 83*)

or more bins. They vary in size and capacity from 2,000 to 15,000 lb. of treated stock per hour.

Avoiding Reinfestation

Even though centrifugal force as applied in the reported tests does destroy all insect life in the treated stock, there are several precautions that should be practiced to prevent infestation after treatment. First of all, when the machine is not in operation the feed or inlet opening should be closed. Otherwise, the insects in an infested mill may find their way through the machine into the chutes, bins and packing equipment. Second, the machine should be set as close as possible to the packers or fillers and be connected with them by tightly built chutes or bins. Third, machines intended to discharge into several bins should be connected with those bins by a closed system of tightly

built conveyors. Fourth, all containers in which the treated stock is to be packed and all liners and other wrappers should be systematically fumigated before use. Fifth, packers and fillers should be kept free from dust accumulations and should be periodically fumigated. Otherwise some form of infestation may occur between the time of filling and the time of closing and sealing the packages.

Another precaution that should be kept in mind is that mechanically treated products may become infested during handling and storage, just as will fumigated stock. Tight-wrapped cartons and tape-sealed multiwall paper bags offer more resistance to post-treatment infestation than do cloth bags, wire-sealed or twine-sewed paper bags, or glued lap-sealed cartons.

If post-treatment infestation seems likely and facilities are not available for periodic fumigation, low-temperature storage offers possibilities. Studies have shown low temperatures to be particularly effective in the case of stored grain. The low temperatures reported in Table II are not necessary for protective storage, particularly of cereal products, if low humidity conditions prevail to the end that the moisture content of the food be kept below 11 percent and the temperature range below 70 deg. F. These conditions have not been proved effective for powdered soups or soup mixes, however.

While these machines have in most cases been commercially used on wheat, wheat flour and flour mixes, the principle on which they operate suggests that dehydrated soups, powdered bean and pea mixes, various granular cereals and similar foods subject to infestation might be given equally protective treatment.

In the milling industry alone, as many as 150 installations have been made in the United States and Canada during the past 3 years.

Until the recent past, food processors in general, and flour millers in particular, have depended heavily upon good housekeeping and careful sieving of their finely ground products to keep insect infestation under control. Others who were skeptical of the slogan, "A clean mill has no bugs," have made systematic use of fumigants and dry heat to supplement their housekeeping practices.

But as the number of food seizures because of insect infestation continues to grow, there is the realization that previous practices no longer suffice. Spread of these infesting insects by the shipment and handling of grains stored for long periods on the farms, in and near wooden country elevators, and under conditions that make heavy infestation possible has resulted in the

WIN YOUR WAR
Against Infestation

Continuous Destruction of Insect Eggs and all forms of Infestation now obtained with the

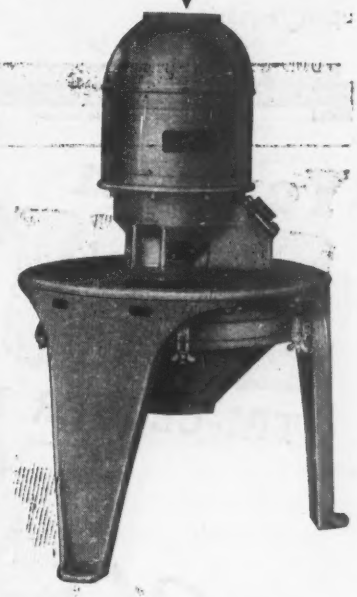
ENTOLETER
INFESTATION DESTROYER
REG. U. S. PAT. OFF.

Actual operating records in food plants and independent laboratory tests prove that "ENTOLETER" control positively destroys all insect eggs, larvae, pupae and adults in free flowing dry materials.

"ENTOLETER" operation is simple, continuous and entirely mechanical. No heat is involved. Moisture content remains unchanged. Gluten, starch cells and baking qualities of flour and similar products are unharmed.

Says an "Entoleter" owner, *"Since the installation of your machine no infestation of any type has been found, nor has any been reported from the trade."* Other food processors report equally satisfactory results after installing the "ENTOLETER".

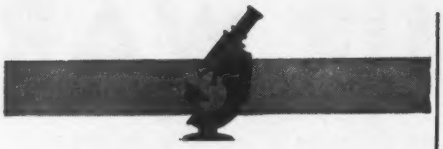
Let us show you how "ENTOLETER" control can be applied to your plant. Entoleter Division, The Safety Car Heating & Lighting Company, Inc., 230 Park Ave., New York, N. Y.



Small space and low headroom requirements are extra advantages of the "ENTOLETER." "ENTOLETERS" are made to handle 2,000, 5,000, 10,000 or 15,000 lbs. per hour.

ENTOLETER
INFESTATION DESTROYER
REG. U. S. PAT. OFF.

CONTINUOUS DESTRUCTION OF ALL INSECT LIFE



AVAILABLE TO FOOD EXECUTIVES

A new brochure, "Science at Your Service", has been prepared for executives, plant managers, technologists and others in the food field.

War times present many new problems. New ingredients, new formulas, new processes, new packaging—vitamin retention, enrichment and control.

This brochure describes the facilities of our organization in helping you meet these problems. A copy will be sent upon request.

FOOD RESEARCH LABORATORIES INC.
48-14 Thirty-Third St. Long Island City N.Y.
Over 20 years' service to industry

breakdown of these previously used and effective means of control. This breakdown is such that another means, such as continuous mechanical treatment, appears to be good insurance against continued loss of much needed food supplies.

Sanitation Pays Dividends To the Egg Dehydrator

(*Continued from page 91*)

65 deg. F. for 6 hours, while those represented in Table III showed marked growth in that length of time even at 30 deg. F. The figures also indicate that eggs can be held for a few hours without deterioration, but that at a certain point the rate of growth begins to increase rapidly.

Bacterial growth takes places at temperatures ordinarily thought to be safe. Table IV illustrates that bacterial growth takes place even under conditions found in the ordinary freezing operation where the rate of cooling is slow. At 30 deg. F., which is below the freezing point of water, there was marked growth, but here again eggs of doubtful character were the ones that deteriorated. It will be seen that, with a high initial bacterial count, there was rapid growth even at this temperature, while growth was very slow in starting where the initial counts were low. These facts also demonstrate that there should be no delay in the preparation of liquid eggs for freezing and that freezing should be done as rapidly as possible.

The care with which equipment is used and the sanitation practiced in the clean-up and handling have important bearings upon the quality of the egg produced. Pumps and pipelines which are allowed to stand filled with liquid eggs will become bacterial incubators in a very short time. Equipment should not be shut down and allowed to stand without cleaning until the next day. It is injurious to the machinery and contaminates the entire plant.

Foam should not be allowed to accumulate on tanks of liquid eggs, because rapid bacterial growth will take place in such foam. Even though the liquid egg may be cold the insulating value of foam is such that 1 in. above the liquid surface the temperature will be nearly that of the room. When the foam is washed down in the tank it becomes the source of serious contamination.

The dividend of good sanitation is paid in the quality of the dried-egg powder produced. Where good eggs are used and good sanitation is practiced the bacterial count will be low. It is not uncommon for dried-egg powder to be produced with a viable bacterial count of less than 25,000 per gram. Such powders are produced only where the time and effort is taken to clean the equipment thoroughly and to handle the eggs rapidly. All other factors being equal, such a powder will be of high edible quality and one that any company should be proud to produce. It has a very good chance of being rated as Grade A powder and hence will command the highest price. If through lack of sanitation and proper handling the powder is judged to be Grade B, then the producer receives 3 cents per pound less for the powder than a powder produced under proper conditions. Thus it can be seen that sanitation improves quality and that quality pays dividends in the form of profit to the manufacturer.

You can BUY TRI-CLOVER PUMPS and FITTINGS NOW

If you have the proper priority. The major portion of our manufacturing facilities is now devoted to war production. However, we are endeavoring to maintain a complete stock of Tri-Clover Sanitary Fittings and Pumps—in Trialloy, nickel-plated bronze and stainless steel. Essential buyers with proper priority can get delivery. How long we can maintain complete stocks, we don't know. Production of war goods comes first, and will *continue* to come first, in our plants.

TRI-CLOVER MACHINE CO.
KENOSHA • WISCONSIN

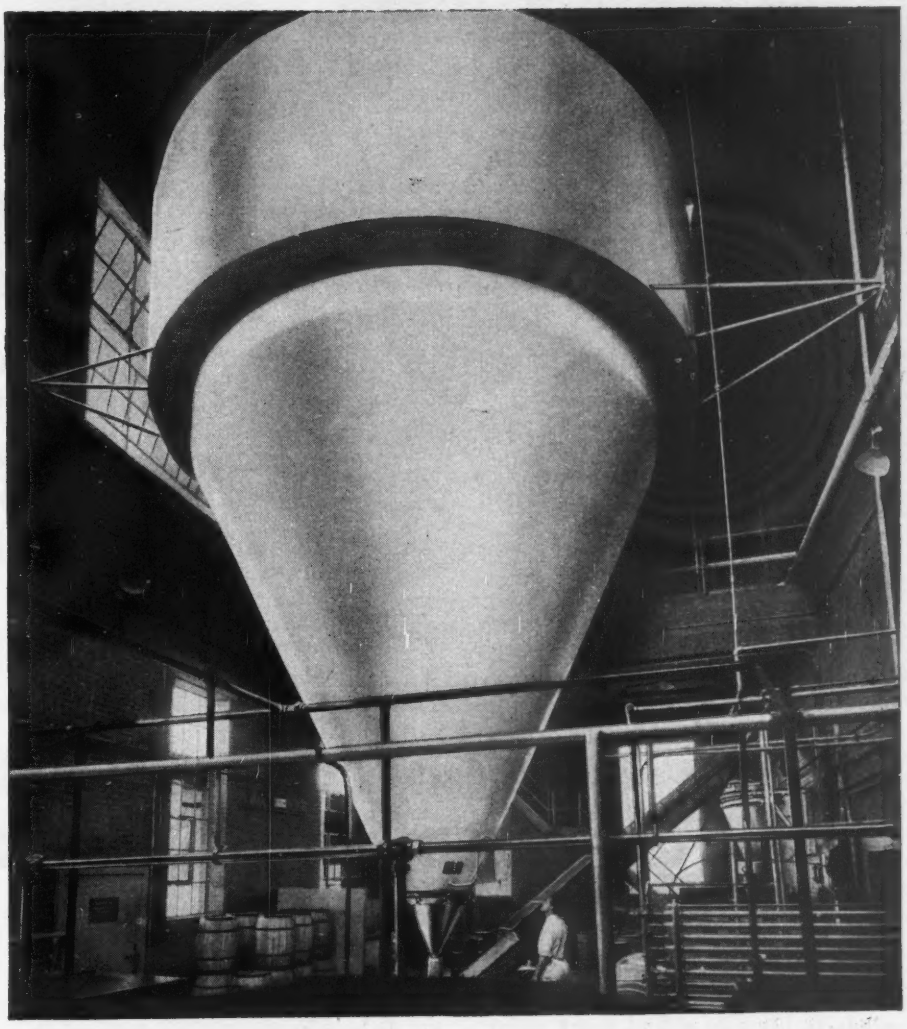
TRI-CLOVER

REFERENCES

1. Horowitz (1902), Thése, Paris. Through L. F. Rettger (see Reference 2).
2. L. F. Rettger, The Bacteriology of the Hen's Egg, With Special Reference to Its Freedom from Microbial Invasion, Storrs (Conn.) Agricultural Experiment Station *Bulletin* No. 75 (1913).
3. L. S. Stuart and E. H. McNally, Bacteriological Studies on the Egg Shell, *U. S. Egg and Poultry Magazine*, vol. 49, 28-21, 1943.
4. L. S. Stuart and C. E. Sidler, The Freezing of Egg Products, With Special Reference to the Suitability of Various Types of Containers, Published by National Egg Products Association, Chicago, Ill., July, 1942.

10 ADVANTAGES OF SPRAY PROCESS DRYING LIQUID FOODS THE GRAY-JENSEN WAY

The GRAY-JENSEN SPRAY PROCESS DRYING PLANT



Gray-Jensen Plants are designed for the spray drying of whole milk, skim milk, buttermilk, cream, ice cream mix, malted milk, whole egg, egg yolk, egg albumen, infants' foods, soup mixtures, and all other food products and chemicals that can be reduced to liquid form and handled with pumps.

1. Complete recovery of solids. The powder produced is equal in weight to the full weight of the solids in the fluid.

2. Operates at low temperatures which retain natural flavor

3. Temperature control prevents bacterial growth.

4. Care and design of the equipment makes washing and sterilizing easy.

5. Complete utilization of heated air gives added economy.

6. No vacuum pan or evaporator required. This means a saving of steam, although such auxiliary equipment can be successfully used to increase production.

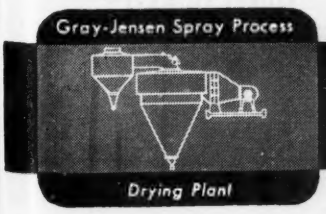
7. Low temperature exhaust gives greater economy of operation.

8. Can be operated at top efficiency for as long as 22 hours a day.

9. Semi-automatic, one man can operate it.

10. The entire unit is designed, manufactured, installed and inspected by skilled Douthitt engineers.

*Solubility * Full Recovery of Solids * Flavor Goodness * Keeping Quality * Economical Operation*



The DOUTHITT CORPORATION
CHICAGO, ILLINOIS

To get your product in the nation's market basket today ...YOU NEED HIGH VITAMIN VALUES!

"The day will surely come when every food manufacturer will have his products literally picked apart, point by point, in determining their right to a place in the family market basket."

(FOOD MATERIALS "Guide to Enrichment", November, 1942)

That day has already arrived!

Right now there are two kinds of currency being used in buying many food products—money and points. And as your own wife can tell you, *points are by far the most important!*

As a result, America's housewives are shrewdly insisting on getting maximum nutritional value for each precious point they have.

No more haphazard buying on the home front! And none when Uncle Sam buys for the boys on the battle front. Today your products must justify their right to a place in the rationed family market basket . . . must justify their right to precious cargo space. And when the decisions are made, the word "Enriched" has a truly amazing effect—for everyone knows that "Enriched" means *improved!*

If your products don't measure up in vitamins—if they have lost vitamins in processing—somebody else's "Enriched" products may crowd yours out.

So give serious thought to enriching. Find out today which of your products, in the opinion of nutritional authorities, should be enriched. Then with vitamin enriching costs down to a mere fraction of what they used to be, go ahead and give your products the soundest possible nutritional foundation.

Do this not only to safeguard your present sales, but also to insure your after-the-war position.

Let us give you the latest technical information on how to enrich, the new low costs and the many benefits. We pioneered in vitamins and today are furnishing a goodly percentage of the nation's vitamin B_1, B_2 and C requirements. Write for these latest sales enriching facts today. Hoffmann-La Roche, Inc., Vitamin Division, Roche Park, Nutley, New Jersey.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

DAIRY PRODUCTS

Calcium and Phosphorus In Cottage Cheese

COMPARISON with the analyses reported for a large number of other foods indicated that commercially made cottage cheese is a good source of Ca and P in the human diet. Samples were received weekly from the regular run of commercial production by 11 different dairies.

Total solids varied from 14.89 to 28.71 percent, ash from 0.62 to 2.31, Ca from 0.046 to 0.106 and P from 0.172 to 0.359, with averages of 22.8 percent of total solids, 1.22 percent of ash, 0.080 percent of calcium and 0.230 percent of phosphorus. There were wide variations between the different dairies and between different samples from the same dairy.

Digest from "The Calcium and Phosphorus Content of Commercially Made Cottage Cheese," by O. F. Garrett, *Journal of Dairy Science*, vol. 26, 305-308, April, 1943.

Positive Phosphatase In Refrigerated Cream

DEVELOPMENT within two or three days of a positive phosphatase test in pasteurized cream held at 4 to 10 deg. C., and while the cream is still in salable condition, appears to be due to bacterial phosphatase. In a preliminary investigation, 47 samples of commercially pasteurized cream with 16 to 40 percent butter fat, when stored at 10 deg. C., gave no positive phosphatase test on the first day, 13 positive on the second day, 18 on the third and 26 positive on the fourth day, although the odor and flavor indicated that the cream was still in salable condition. Butterfat content had no effect, and there was no change in titratable acidity or pH.

Cream pasteurized at 63 deg. C. for 30 minutes soured within 24 hours at 25 deg. C. and developed no positive phosphatase, but at 10 deg. C. a positive test was obtained in 48 hours and at 4 deg. C. in 96 hours. In all cases organisms identified as phosphatase-producing strains of *Bacillus cereus* and *B. mesentericus* were present when a positive test was obtained. These organisms were not detected in samples with negative phosphatase tests. There was no evidence of the presence of bound or protected phosphatase adsorbed by the milk fat. Further evidence of the bacterial origin of the positive tests was found in the fact that mercuric chloride prevented development of positive tests in pasteurized cream samples inoculated with the phosphatase-producing organisms.

By inoculating cream with phosphatase-producing organisms and pasteurizing at various temperatures from 61.8 to 100 deg. C., it was found that milk phosphatase is inactivated at 62.8 deg. C. for 30 minutes but the bacterial phosphatase was still active after the same time at 79.4 deg. C. Both bacterial phosphatase and milk phosphatase were active over the same pH range, but bacterial phosphatase showed maximum activity at pH 9.72 and milk phosphatase at pH 8.77 to 8.82.

If a sample of cream gives a positive phosphatase test, reheating for 30 minutes above normal pasteurizing temperatures but below 76.6 deg. C. and retesting for phosphatase activity will distinguish between positive tests due to milk phosphatase and those due to bacterial phosphatase. The New York rapid field test for phosphatase was used.

Digest from "The Development of a Positive Phosphatase Test in Refrigerated, Pasteurized Cream," by F. W. Barber and W. C. Frazier, *Journal of Dairy Science*, vol. 26 343–52, April, 1943.

PACKAGING

Container Lining Wax

IN the disclosure of a recent patent the principle is discussed of preventing loss of aroma constituents from a liquid in a wax-lined container by incorporating suitable aromatic and flavoring constituents in the lining wax. It is stated that waxes generally have a pronounced tendency to weaken or destroy the flavor of beverages such as beer, due to an affinity of the wax for the flavoring constituents, either through absorbency of the wax or some chemical reaction which takes place during pasteurization or storage. In the case of beer, treating the wax with hops will prevent loss of the characteristic flavor in the beverage. The entire batch of wax may be treated with hops to produce the desired degree of aroma or a small quantity of highly flavored wax may be added to the main batch while molten.

The two claims of the patent cover a wax-lined container for beer or other food products, having a nonbrittle, firmly adhering lining with melting point above the pasteurizing temperature, the lining containing up to 2 percent of a 221- to 226-deg. F. melting point amorphous wax with an ester value of 110 to 125 and an acid value of 10 to 15.

Digest from U. S. Patent 2,306,576, issued Dec. 29, 1942, to A. H. Warth and W. C. Rainer, and assigned to Crown Cork and Seal Co., Baltimore, Md.

CEREAL PRODUCTS

Fermentation of Kiln-Dried Corn

FERMENTATION tests on experimentally kiln-dried samples gave a consistently lower yield of alcohol for corn which has been heated than for the unheated corn. The decrease, which amounts to 2 or 3 percent, appears to be independent of the time required to dry the corn to the desired moisture content and also independent of the final moisture content. Under certain conditions, drying at temperatures above 200 deg. F. produced a further decrease, the total being 4 to 6 percent loss of alcohol production.

The authors suggest that the loss in alcohol yield may be due to production of a certain amount of unfermentable dextrines.

Digest from "Reduction of the Fermentable Carbohydrate Content of Corn by Kiln Drying," by S. L. Adams, W. H. Stark and P. Kolachov, *Cereal Chemistry*, vol. 20, 260-66, March, 1943.

Dry-substance Tables For Starch Suspensions

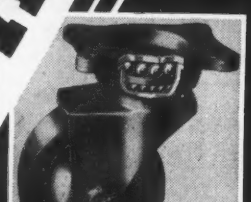
HYDROMETER measurements on starch suspensions or slurries can be expressed in terms of dry-substance content. The success of the hydrometer for measuring solids in suspension is due to the relatively slow settling of the starch and the substantially constant concentration of the starch suspension at the hydrometer bulb.

The authors present a table suitable for general factory use based on Baumé measurements for cornstarch from the final washing filter in the factory, when it is ready for drying to pearl starch or hydrolysis to corn sirup.

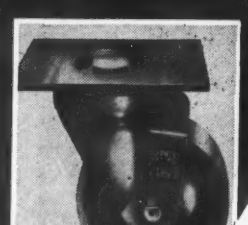
Since factory tests are not made at consctant temperature, a table of tem-

FREE
DARNELL
MANUAL

DARNELL
CASTERS



Pre-tested for Performance



Responsive
Reliable
Rugged

DARNELL CORP. LTD.,
LONG BEACH, CALIFORNIA.
60 WALKER ST., NEW YORK, N.Y.
36 N. CLINTON, CHICAGO, ILL.

perature corrections is also presented.

The method is capable of general application. By means of Baumé measurements at 60, 100 and 140 deg. F., it is shown how similar tables can be constructed mathematically for any specific starch if the absolute density is known. The original article must be consulted for details.

Digest from "Baumé-Dry Substance Tables for Starch Suspensions," by J. E. Cleland, E. E. Fauser and W. R. Fetzer, *Industrial and Engineering Chemistry, Analytical Edition*, vol. 15, 334-36, May 15, 1943.

FATS AND OILS

Antioxidants for Fruit Oils

STABILIZATION of the flavor and color of fruit juices, flavoring materials, essential oils, extracts, and so forth, by use of an oxidation inhibitor, which may be hydroquinone, toluhydroquinone, catechol or resorcylaldehyde, is covered in a patent recently issued. An example of the use of these materials is the addition of hydroquinone to fresh oil of lemon, orange or lime in the proportion of 0.01 to 0.6 percent by weight. Another suggested use is in a flavoring material for gelatine desserts prepared by dissolving gelatine in water and adding ethyl succinate, hydroquinone and flavoring oil, using 0.03 gm. hydroquinone for 21 gm. of orange oil, 0.019 gm. for 16 gm. of lemon oil or 0.012 gm. for 10 gm. of lime oil. This mixture is dried and ground for use in flavoring the dessert, which is claimed then to have very satisfactory keeping qualities.

Digest from U. S. Patent 2,315,858, issued April 6, 1943, to W. R. Johnston, W. E. Stokes, M. H. Kennedy and C. N. Frey, and assigned to Standard Brands, Inc., New York.

Olive Oil Substitutes

PECAN oil, refined peanut oil and crude safflower oil were compared with high-grade virgin olive oil from the Mediterranean region. None of these edible oils simulated olive oil in composition, but they can replace olive oil for certain purposes. Peanut and pecan oils may possibly be modified to yield a product chemically similar to olive oil.

Under present market conditions the production of pecan oil does not appear attractive, unless processing costs can be much reduced. Safflower seed can be grown in Texas and New Mexico, yielding 1,500 to 2,000 lb. of seed per acre. It is grown and harvested in a manner similar to spring wheat. The oil can be processed in cottonseed oil mills without change of equipment.

The pecan oil tested was obtained by expeller pressing of meats accumulated over a period of 10 to 12 months. It was not deodorized and not strictly fresh when received at the laboratory. The cottonseed oil was refined edible quality.

Results of analyses are shown in the accompanying table.

Composition of Oils

	Virgin olive oil	Edible peanut oil	Edible pecan oil	Crude safflower seed oil
Unsaponifiable matter (%)	0.9	0.4	0.4	1.0
Saturated glycerides (%)	7.9	21.0[1]	4.0	6.8
Unsaturated glycerides (%)	91.2	78.6	95.6	92.2
as triolein (%)	80.9	44.1	70.9	18.6
as trilinolein (%)	10.1	34.5	25.2	70.1
as trilinolenin (%)	0	0	0	3.4
Iodine No.	87.0	97.7	104.5	146.5
Thiocyanogen No.	78.5	69.7	84.0	86.4
Saponification No.	190.4	191.2	192.8	189.9
Acid No.	4.15	0.23	1.10	1.66
Acetyl No.	4.3	2.5	3.6	1.1
Smoke point (°F)	280	388	335	318
Flash point (°F)	550	628	600	602
Fire point (°F)	670	685	680	682

[1] Computed, since Bertram oxidation method gave low results.

Digest from "Possibilities of Peanut, Pecan and Safflower Seed Oils as Supplements for Olive Oil," by W. G. Bickford, G. E. Mann and K. S. Markley, *Oil and Soap*, vol. 20, 85-89, May, 1943.

Unsaturated Fatty Acids Of Hydrogenated Fats

INCREASED resistance to rancidity of hydrogenated fatty oils depends on the selective hydrogenation of linoleic acid to oleic acid, but hydrogenated shortening contains glycerides derived from fatty acids more unsaturated than oleic. Analyses are reported for 227 samples of edible fats collected from widely scattered cities of the United States. Iodine value, thiocyanogen value, and percentage of glycerides derived from linoleic acid, oleic acid and saturated acids are reported.

Hydrogenated shortening is considered to be cottonseed oil and other unsaturated vegetable oils selectively hydrogenated until the iodine value is about 75, generally supplied in plasticized form, with or without the addition of relatively small quantities of more highly hydrogenated fat. Another group, of the type formerly called "compound," consists of about 6 parts by weight of unhydrogenated oil, mixed with one part of vegetable oil which has been hydrogenated almost to saturation. This type, for which there is now no recognized type designation, is here identified as "hydrogenated, less than 100 percent."

Samples were collected in such a way that they may be considered to represent at least 90 percent of the shortening on the market consisting of or containing hydrogenated fat, and other samples fairly representative of their respective types.

The range reported was:

Type of Fat	No. of Samples	Percent glycerides of linoleic acid High	Low	Average
Butter	41	4.8	1.4	3.3
Margarine	57	23.4	1.3	10.9
Lard	27	13.7	6.5	11.7
Hydrogenated 100%	60	22.4	2.9	12.6
less than 100%	31	38.2	4.7	22.0
Mixed animal and vegetable	11	26.2	10.4	20.6

Digest from "The Unsaturated Fatty Acids of Hydrogenated Shortening and Other Edible Fats," by J. T. R. Andrews and A. S. Richardson, *Oil & Soap*, vol. 20, 90-94, May, 1943.

VITAMINS

Brewers' Yeast

BREWERS' yeast is recognized as a good source of high-quality proteins and of the B vitamin complex. It can be incorporated into other foodstuffs in fairly large proportions. Peanut butter, for instance, can carry as much as 15 percent. Small amounts are regularly added to dehydrated soups, bouillon cubes, soup stocks and similar products.

It is estimated that the brewing industry could make available almost 200 million pounds of residual yeast per year by salvaging all the waste yeast. Until recently only the large breweries dried yeast, but equipment is now supplied for profitably handling smaller production, down to as little as 150,000 lb. per year.

Yeast must be processed immediately on removal from the fermenters. The sediments are collected and kept as cold as possible to prevent autolysis. For feedstuffs the yeast is dried without pretreatment, but for direct food uses it must be debittered. Debittering removes the yeast hop resins, the process in general being based on the weakly acidic properties of these resins. Typical reagents are dilute sodium or ammonium carbonate. To prevent loss of vitamin potency, the treatment must be at the lowest possible pH and temperature, for a short period of time, with minimum aeration and agitation.

Digest from "Brewers' Yeast in the War Effort," by P. P. Gray, *Wallerstein Laboratories Communications*, vol. 6, 50-54, April, 1943.

Vitamin-B Complex In Dehydrated Meat

BEEF and pork, cubed and cooked, then ground and dried to a moisture content of less than 10 percent, were tested for vitamin retention after processing.

Riboflavin is completely retained. Niacin and pantothenic acid show losses of 20 to 30 percent of the original content. About 60 percent of the thiamine is retained. Representative values, expressed as micrograms per gram of the dehydrated product

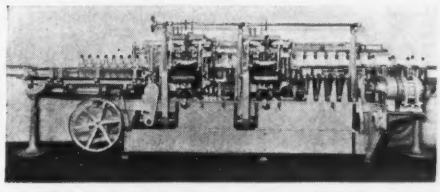
You'll never come to this...

... if you take care of your

WORLD Automatic and Semi-Automatic LABELERS

WORLD Labelers are built to give years of continuously dependable service. Given reasonable care they'll see you through the emergency.

The men and machines that used to build WORLD Labelers are now heavily engaged in war production. But we're not too busy to help you all we can on all problems of conversion, service, lubrication or maintenance. Don't fail to get in touch with us.



Users of this WORLD Automatic *"Bee-Line"* Straightaway Labeler will assure you that it's a *considerable* improvement over the "two man power" labeling method indicated above. It applies front or front and back labels to any shape and size of glass container—steadily, safely and surely in a continuous, straight line, without stops, detours or collisions.

GET THIS booklet on labeler care and maintenance. It's chock full of useful, practical information. Yours for the asking.

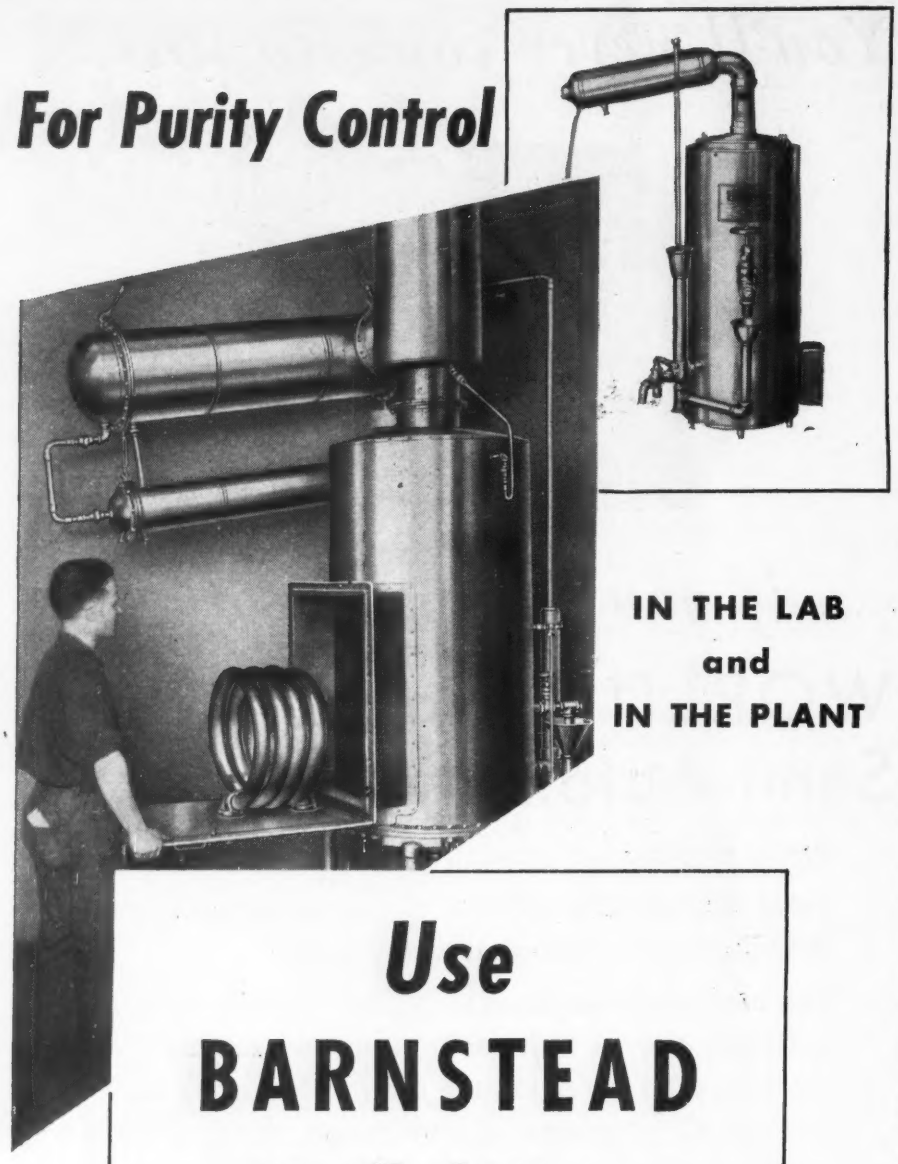
ECONOMIC MACHINERY COMPANY

Builders of World Automatic and Semi-Automatic Labelers for Every Purpose

Worcester, Massachusetts

NEW YORK PHILADELPHIA PITTSBURGH CHICAGO SAN FRANCISCO DENVER LOUISVILLE
SALT LAKE CITY EL PASO SEATTLE PORTLAND LONDON MONTREAL TORONTO WINNIPEG
SPOKANE VANCOUVER SYDNEY, AUSTRALIA WELLINGTON, N. Z. SAN JUAN, P. R.

For Purity Control



IN THE LAB
and
IN THE PLANT

Use BARNSTEAD Distilled Water

In the control lab it is necessary to work with pure distilled water that meets set standards day in and day out *without variations.* The same holds true in the plant. Variations in the purity of the water used in your products can upset your quality control and cause inferior results.

The simple thing to do is what many leading names in the food industry do. They use Barnstead Water Stills in their control labs for experimental work and Barnstead Stills in their plant for actual production.

In that way, they are absolutely sure of their water supply . . . sure that no impurities will affect their good products and good reputations for quality.

Why not do the same. The cost is negligible. Barnstead Water Stills are economical to operate. Sizes range from ½ to 500 gallons per hour. Operation is by steam, gas, or electricity.

Barnstead
STILL & STERILIZER CO. Inc

130 LANESVILLE TERRACE, FOREST HILLS, BOSTON, MASS.

are, for beef, riboflavin, 6.40; niacin, 128.5; pantothenic acid, 6.01; thiamine, 1.61; and for pork, riboflavin, 7.8; niacin, 97.5; pantothenic acid, 10.15; thiamine, 12.10.

Digest from "Vitamin B-Complex Studies on Dehydrated Meats," by E. E. Rice and H. E. Robinson, paper presented before the Division of Agricultural and Food Chemistry, American Chemical Society, Spring Meeting, Detroit, Mich., April 12, 1943.

MISCELLANEOUS

Potato Flour

POTATO flour is being used extensively in Great Britain in the baking trade, and as a thickening agent in soup powders, sauces, pastes and also as a filler in sausages and confectionery.

For cooked potato flour the potatoes are treated in a 2-ton capacity steamer at a pressure of 10 lb. per square inch for 25 to 30 minutes, then roller dried and milled. Spray drying has not been used extensively. For uncooked flour, raw chips are dried on a conveyor in a tunnel about 70 ft. long, operated at 200 to 230 deg. F., with a production rate of 2,000 lb. per hour. Four of the six plants in operation make cooked flour, and more of this type are under construction.

It has been found that in bread, up to 10 percent of potato flour as now made, without removing skins, improves the keeping qualities and shows no tendency to excessive rope development. Up to 25 percent can be incorporated in specialties such as scones, plain cakes and pastries.

Digest from "Potato Flour," by A. Barker, *Food*, vol. 12, 16-18, January, 1943 (published in England).

Preservation of Eggs

QUALITY of shell eggs may be preserved by a pasteurization process which stops embryonic development, stabilizes thick albumen and destroys many of the spoilage microorganisms. The eggs must be treated when fresh as possible. The time and temperature of the treatment vary, but the best results are obtained with eggs held at 70 deg. F., then rotated in oil at 140 deg. F. for 10 minutes.

The organisms which produce the various kinds of rot are destroyed, but molds, yeasts and spore-forming organisms are resistant. Treated eggs have been found superior to untreated eggs in the hot climate of the Desert Training Center in California. It is expected that the process will be valuable in commercial storage, but results of long storage tests are not yet available.

Digest from "Eggs au Thermal," *Industrial Bulletin of Arthur D. Little, Inc.*, No. 188, April, 1943.

Letters to the Editor

In Defense of Refugee Food Chemists

To the Editor
of FOOD INDUSTRIES:

As a subscriber of your publications for many years, I wish to voice my most violent protest against your unfortunate comments on an Austrian refugee food chemist, appearing in The Talk of the Industry section of the June issue of FOOD INDUSTRIES. I am indeed surprised that a publication of your standing should lower itself to the ranks of bigotry in casting slurs upon capable but unfortunate victims of persecution who are coming from countries with which our nation is at war.

May I point out to you that even the facts you choose to criticize, i.e., the developing of substitutes, is considered a highly commendable action at this time of crisis and that leading American companies are proud to advertise the development of imitation caraway flavor, as well as of other synthetic spices, oils and flavors, in your own publications (June issue, FOOD INDUSTRIES, and others). I am further willing to provide you with a complete list of outstanding refugee scientists who are devoting their recognized skills and tireless efforts to the furtherance of the American war program, both in war essential and essential civilian industries.

I would consider it to your credit if you are going to correct your statements in the next issue of FOOD INDUSTRIES.

An acknowledgment of this letter will be greatly appreciated.—WILLIS W. STEINITZ, *American Food Laboratories, Inc., 860 Atlantic Ave., Brooklyn, N. Y.*

You Can Buy Levulinic Acid in Big Quantities

To the Editor
of FOOD INDUSTRIES:

On page 125 of the May issue of the FOOD INDUSTRIES a question is asked relative to levulinic acid, and the person answering the question indicates that this company would not be able to supply any considerable quantity of that acid. I am sorry that we have not kept you sufficiently informed of our progress with levulinic acid and hasten to give you the following information.

We have in operation a plant capable of producing in the neighborhood of 600,000 lb. of levulinic acid per year and are increasing the capacity of that plant at the present time. While a considerable portion of that production is sold up, we are able to supply quantities from a pound to a carload. We are, however, interested primarily in uses that will continue during peace times and not in temporary uses where levulinic acid will be used merely to replace another acid for the duration. —K. J. SEULKE, *Director of Research Development, A. E. Staley Mfg. Co., Decatur, Ill.*

Why Not Cola Drinks In Form of Tablets?

To the Editor
of FOOD INDUSTRIES:

The beverage base of cola drinks mentioned on page 78 of the May issue of FOOD INDUSTRIES is undoubtedly a good idea. But why not go one step further by mixing the dry ingredients together and compressing them into tablets. The tablets can then be dissolved in a certain amount of water to make the same kind of drinks. It is even possible to add to the ingredients some CO_2-producing materials, thus saving the use of carbonated water.

Besides home use, these tablets easily can be shipped to the soldiers overseas.—H. YANG, *Corvallis, Ore.*

BAR-NUN *Rotary* SIFTERS

Tops in sifting efficiency is yours with a BAR-NUN on the job! If you process a vital dry, powdered or granular material, investigate this modern Sifter NOW! Learn how its complete rotary motion, mechanically controlled, produces thorough, uniform separations. Unusually large capacity. Bar-Nun Rotary Sifters are built in 9 sizes, 4 to 60 sq. ft. of cloth surface.

COMPLETE INFORMATION ON REQUEST

B. F. GUMP CO. 454 S. Clinton St. Chicago, Ill.

ENGINEERS AND MANUFACTURERS SINCE 1872

CONCENTRATING ON CONCENTRATES

Concentrates are not merely a matter of convenience or wartime expediency. Years ago manufacturers realized the amazing utility of Florasynth's concentrated flavoring materials. That throughout the years they have relied on Florasynth Concentrates is "case history" of their effectiveness. That, in days such as these, they can still — for the greater part — depend on their availability and consistency is representative of the ingenuity, research, and resources of Florasynth.

Pioneers in the Creation and Development of Concentrated Citrus Oils

Florasynth LABORATORIES, INC.
1533 OLMSTEAD AVE., NEW YORK, N. Y.

CHICAGO • DALLAS
DENVER • LOS ANGELES
NEW ORLEANS • SEATTLE
SAN FRANCISCO

FLORASYNTH LABS. (CANADA) LTD.—
MONTREAL • TORONTO • VANCOUVER • WINNIPEG
FLORASYNTH LABORATORIES DE MEXICO S. A.—MEXICO CITY

This is the torch Americans carry

THE torch of education has been handed down from generation to generation of Americans. We have no prouder possession.

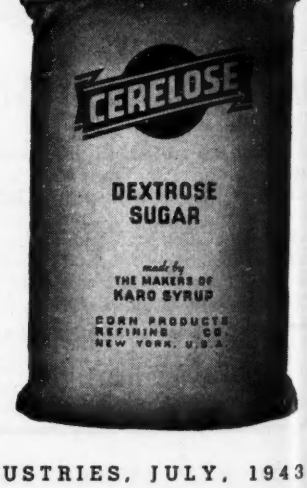
The advertising of dextrose educates the public to know and appreciate the values of this food-energy sugar.

Although the supply of dextrose is hard pressed to meet first the demands of the Army and Navy, and then of the producers of many fine foods enriched with dextrose, the educational force of dextrose advertising continues.

The mutual interests of dextrose refiners, food producers and consumers, over the long haul, are best served by keeping lighted the torch of dextrose education.

CORN PRODUCTS SALES COMPANY
17 BATTERY PLACE, NEW YORK, N. Y.

The advertising of dextrose, as an educational force, doubly benefits America. Consumers learn how this pure white, crystalline food-energy sugar forestalls fatigue, fortifies energy. Asking for foods "Enriched with Dextrose", they increase the use of American corn, grown by American farmers, refined in American factories, distributed by American companies.



CERELOSE *is* DEXTROSE

TUNE IN

Stage Door Canteen

Every Thursday 9:30 to 10:00 P.M., E.W.T., Columbia Network, Coast-to-Coast

FORMULAS FOR FOOD

FORMULA NO. 412

Victory Fudge Cake

Flour	4 lb.
Emulsifying shortening	2 lb. 12 oz.
Sugar	5 lb. 8 oz.
Cocoa	1 lb.
Salt	3 oz.
Soda	1 oz.
Baking powder	4 oz.
Cinnamon	½ oz.
Liquid skim milk	6 lb. 4 oz.
Whole eggs	3 lb. 12 oz.
Vanilla	to taste

Directions

Mix the flour and shortening for 3 to 5 minutes, scraping down the bowl and paddle at least once. Add sugar, cocoa, salt, soda, baking powder, cinnamon and 2½ lb. of skim milk, then mix for 3 to 5 minutes more, scraping down at least once. Mix flavor, milk and eggs, and add about half this mixture to the bowl. Mix until smooth, scrape down and mix until smooth again. Add the remainder of the liquid ingredients and continue mixing for a total of 3 to 5 minutes in this stage, scraping down again to insure a smooth batter.

Use a paddle and slow speed for the entire mixing operation.

For a 7-in. layer cake scaled 10 oz., bake at 375 to 400 deg. F. Adjust baking temperature for other size cakes.

Formula from Procter & Gamble.

FORMULA NO. 413

Liverwurst

Hog livers	95 lb.
Fresh pork trimmings	90 lb.
No. 1 cured beef trimmings	15 lb.
Onions, large	6
Ground celery seed	2 oz.
Marjoram	2 oz.
Coriander	4 oz.
Sugar	8 oz.
Cardimom	1 oz.
Nutmeg	4 oz.
White pepper	12 oz.
Salt	4 lb.
Soya flour	5 lb.

Directions

Grind the cold clean hog livers with the beef trimmings through a fine plate. Place in the chopper with the seasonings and soya flour. Grind until there are large bubbles formed. Add the fresh pork trimmings. Stuff into large hog bungs, not too tight.

Hang in the work room for one hour. Then place in the cooker at 170 deg. F. The temperature of the cooker should be reduced to 160 to 165 deg. F., which is the correct temperature for cooking. Cook for two hours. Cool and place in smoke house overnight, giving the sausage plenty of cold smoke.

These sausages may be dipped in a hot yellow color before smoking, or may be smoked plain, depending on the requirements of the trade. They should be dry, with a good color, after being in the smoke house overnight.

Formula from Stein, Hall Mfg. Co.

FORMULA NO. 414

San Pedro Nut Chews

Corn sirup	50 lb.
Granulated sugar	10 lb.
Molasses	15 lb.
Standardized invert sugar	5 lb.
Coconut oil	5 lb.
Powdered salt	10 oz.
Desiccated coconut	25 lb.
Ground or broken roasted peanuts	30 lb.
Basic fondant (Formula No. 39)	30 lb.
Butter and orange flavors	Ample

Directions

Boil the corn sirup, sugar, molasses, invert sugar and coconut oil to a temperature of 246-250 deg. F. Add the fondant and stir until it is melted. Then add the salt, coconut, peanuts and flavors and mix thoroughly.

Spread the batch out and when cold, size, cut and wrap in waxed paper. The candies may also be coated if desired.

The temperatures given are based on sea level. For each 550 ft. of elevation, decrease the boiling temperature by 1 deg. F.

Formula from Nulomoline Co.

FORMULA NO. 415

Brownies Using Dry Mix with Cocoa

Brownie mix (Formula 416)	5 lb.
Whole eggs	1 lb.
Water (variable)	8 oz.
Pecans or walnuts	12 oz.

Directions

Have brownie mix as near 80 deg. F. as possible. Mix this with about 8-oz. of whole eggs, using low speed until dry mixture is wetted, then high speed for 2 minutes. Scrape bowl. Add the rest of the eggs, beat one or two minutes more, add water, scrape the bowl and mix smooth. Finally, add the nuts and mix only enough to incorporate them. Do not continue mixing after the nuts have been added or they will be broken up too much.

Bake in a heavily buttered and dusted straight-sided sheet pan 17½x25½ in. If the sides are not straight, put a wooden frame inside the pan.

Bake at 325 to 350 deg. F. only sufficiently to cook, usually 40 to 45 minutes at 350 deg. F.

Formula from Parker-Broeg.

FORMULA NO. 416

Prepared Brownie Mix With Cocoa

Sugar	42 lb.
Salt	4 oz.
Vanilla	2 oz.
Butter flavor, concentrated	½ oz.
Powdered corn sirup	12 lb.
Butter or shortening	3 lb.
Hydrogenated shortening	17 lb.
Soda	5 oz.
Cream of tartar	6 oz.
Cake flour	20 lb.
Cocoa (natural)	9 lb.

Directions

Mix together the sugar, salt, vanilla, butter flavor, corn sirup, butter and shortening. Add sifted soda, cream of tartar, cake flour and cocoa. For longer keeping quality replace the butter with hydrogenated shortening.

Formula from Parker-Broeg.

FORMULA NO. 417

Fresh Fruit Lemon Pie Filling

Water	4 lb.
Fine granulated sugar	2 lb. 8 oz.
Cornstarch	8 oz.
Egg yolks	6 oz.
Juice and grated rind of 4 lemons	
Butter	1 oz.
Shortening	1 oz.

Directions

Bring to a boil the sugar and 3 lb. of water. Dissolve the starch in 1 lb. of water and add to the boiling sirup. Boil until it is clear, stirring constantly. Remove from the fire and add the egg yolks, stirring with a hand whip. Do not cook the filling after the yolks have been added. Add the lemon juice and rind, the butter and shortening. Do not put the lemon juice and grated rind into the water and sugar while they are boiling.

Cool before filling into pie shells, which should be baked. Fill 1 lb. 4 oz. for a 9-in. pie plate. If meringue is to be used, fill the shells until about ⅛ in. from the top and then allow the filled shells to stand for 10 or 15 minutes, until a light crust forms on top of the filling. This quantity makes 14 pies in 9-in. pans.

Formula from Lever Bros.

VITAMIN A

NATURAL OR SYNTHETIC?

A NATIONAL MAGAZINE was in error in stating that the best-known vitamins are produced by chemical synthesis. Vitamin A, the first of them all, is produced entirely from natural sources. Vitamin E also is produced from natural sources at a cost which compares more than favorably with the synthetic variety.

Why Natural Concentrates of Vitamin A?

In our distilled Vitamin A *Ester* Concentrates we have combined the proved biological potency of the natural material with the uniformity, purity and high concentration of a synthetic chemical.

Ester-Vitamin A is a unique product distilled from a variety of marine oils gathered from all parts of the world. Production is not dependent on rationed chemicals or war priorities. It is *always* available.

Prepared by our unique process of high vacuum molecular distillation, DPI's Natural *Ester* Concentrate of Vitamin A combines the potency, blandness and uniformity expected of a synthetic with the stability which comes from concentrating with the Vitamin A the natural protective agents of the original fish oil. If you want the best Vitamin A obtainable, contact us at once.

In view of transportation conditions and other wartime factors, it might be prudent to order a sufficient supply of Distilled Vitamin A Esters* to build up a reserve against the time when your production calls for immediate additional quantities. We sell on long term contract, with deliveries as desired, so that supplies are assured.

*Protected by U. S. product patent No. 2,205,925 and more than 50 process patents.

DISTILLATION PRODUCTS, INC.

755 RIDGE ROAD WEST, ROCHESTER, NEW YORK
JOINTLY OWNED BY EASTMAN KODAK CO. and GENERAL MILLS, INC.

SALES AGENT: SPECIAL COMMODITIES DIVISION, GENERAL MILLS, INC.
MINNEAPOLIS, MINNESOTA

"Oil-Soluble-Vitamin Headquarters"

Presentation of Army-Navy "E" Production Award to the employees of Chas. Pfizer & Co., Inc., by Lt. Col. R. R. Patch, Sn. C.

WE ARE PROUD TO ANNOUNCE that the War Department has judged the results of the efforts of our Company and its employees as worthy of the Army-Navy "E" Production Award for Excellence in War Production.

Realizing that this award is a trust, as well as an honor, we intend to bend every effort toward continuing to fill all requirements of our government for those of our products essential to the winning of the war.

MANUFACTURING CHEMISTS • ESTABLISHED 1849

Chas. Pfizer & Co., Inc.

81 MAIDEN LANE, NEW YORK • 444 W. GRAND AVE., CHICAGO, ILL.

Say "It Tastes Good" with COLOR

Food displayed in glass containers must have uniform, tempting color to win the ration points today! National Certified Food Colors can help you to put vital "Tastes Good" shelf-appeal into your products.

Pioneer domestic producer of Certified Food Colors, National produces the food industry's oldest and largest line of Primary Colors and Blends.

Our thirty seven years of Food Color experience is at your service for color matches, formulas and other food-color data. We invite your inquiry.

Certified Food Color Division

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET NEW YORK, N. Y.

BOSTON · PROVIDENCE · CHICAGO · PHILADELPHIA · SAN FRANCISCO · CHARLOTTE · GREENSBORO · ATLANTA · NEW ORLEANS · CHATTANOOGA · PORTLAND, ORE. · TORONTO

Extend Flavor with SPICEOLATES

D&O "SOLUBILIZED" SPICE OIL FLAVORS

SPICEOLATES help you solve one of today's big supply problems resulting from governmental restrictions on the use of spice oils. Use SPICEOLATES to great advantage in stretching your supply of natural spice oils and also, to replace dry spices now used in your formulas.

CALL D&O WITHOUT DELAY

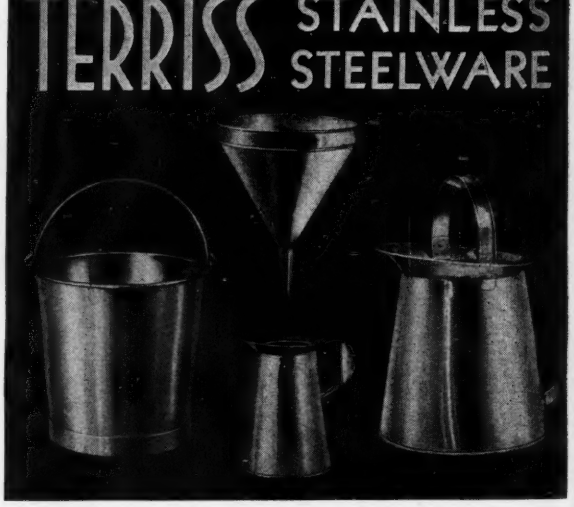
DODGE & OLCOTT COMPANY

180 VARICK STREET · NEW YORK, N.Y.

BOSTON · CHICAGO · PHILADELPHIA · ST. LOUIS · LOS ANGELES

Plant and Laboratories: Bayonne, N. J.

D.O ESTABLISHED 1798



The above four pieces are representative of our complete line of TERRISS Stainless Steelware. IN SHEET STAINLESS STEEL we have open and closed tanks, with or without mixers, batch cans, funnels, measures, pails, scoops, evaporating pans, dippers, etc. IN CAST STAINLESS STEEL we have sanitary fittings, water filters, syrup filters, strainers, piping and tubing. We are also prepared to fabricate equipment to specifications.

All orders subject to preference ratings

CONSOLIDATED

SIPHON SUPPLY COMPANY, INC.

22-24 WOOSTER ST. NEW YORK, N. Y.

Calcium ... NOW A "BODY-BUILDER"

FOR *Tomatoes*

The importance ot calcium in building strong bones and healthy teeth has long been recognized by all nutritionists. Now comes a new and unusual role for calcium . . . that of "body-builder" for tomatoes.

Research work at the New York Agricultural Experiment Station reveals that the addition of minute amounts of calcium to canned tomatoes will increase their firmness to a noteworthy extent. Less than 0.02 per cent of added calcium seems to solidify the fruit sufficiently to up-grade the quality from one to two notches.

The role of calcium as a "body-builder" for tomatoes may be novel or unusual. Yet it is no more interesting . . . and certainly not nearly as important to most Americans . . . than the role of calcium as a human body-builder.

It is a well known fact that a high percentage of our population is suffering from a lack of calcium. Equally disturbing is the deficiency in iron that causes many to be anemic. The addition of these vital minerals . . . calcium, iron, and phosphorous . . . to any staple food product is still important news to most housewives today. In the not too distant future, mineral fortification will probably become a definite prerequisite to consumer acceptance.

Why not prepare *your* product for that day, now . . . and for the stiff post-war competition to come? While the available supply of Victor mineral supplements is now used exclusively in war-essential foods, laboratory samples for experimental purposes can be supplied. Our technical staff will gladly lend assistance in solving processing or similar problems. Just write us.

VICTOR
Mineral Supplements

- *Monocalcium* PHOSPHATE
- *Dicalcium* PHOSPHATE
- *Tricalcium* PHOSPHATE
- *Monosodium* PHOSPHATE
- *Disodium* PHOSPHATE
- *Iodized Tricalcium* PHOSPHATE
- *Sodium Iron* PYROPHOSPHATE

ARMY E NAVY

VICTOR *Chemical Works*

WORLD'S LARGEST MANUFACTURERS OF FOOD PHOSPHATES
141 WEST JACKSON BOULEVARD, CHICAGO, ILLINOIS

MATERIALS
FOR THE FOOD MANUFACTURER

VioBin ANTIOXIDANT

An effective antioxidant in concentrations of 0.05 and 0.1%; for animal and vegetable fats.

DEFATTED, DEHYDRATED
PERFECTLY STABLE

WHEAT GERM
CORN GERM

Richer in B complex than original raw germ. Among richest foods known in B complex, high quality protein, iron and phosphorus.

VioBin WHEAT GERM Oil

Perfectly stable—requires no refrigeration.

VIOBIN CORPORATION
36 Oak St. Monticello, Ill.
VioBin (Canada) Ltd., 637 Craig St., West, Montreal, Quebec

Why does
CARROT OIL
make foods golden yellow?

Because carrot oil contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.

Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil, and because it contributes vitamin A of high stability and desirable golden yellow color.

Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

Also producers of ThiaBee, a stabilized wheat germ products rich in Vitamin B_1.

These vitamin products are of particular interest to all manufacturers of food products.

Inquiries are invited. Literature, prices and samples to firms requesting same on their letter heads.

NUTRITIONAL RESEARCH ASSOCIATES, INC.
201 Broad Street
South Whitley, Indiana

SH EST. 1866 *High Quality* and **UNIFORMITY** In Our Brands of...

Tapioca Flour — Rice Starch
Pearl Tapioca — Potato Starch
Egg Albumen — Rice Flour
Egg Yolk — Potato Flour
Stabilizers — Soya Bean Flour
Corn Starch — Vegetable Gums
Granulated and Flake Tapioca
Pure Food Dextrines

STEIN, HALL & COMPANY, Inc.
285 Madison Avenue, New York
Boston Providence Chicago Rochester
Philadelphia Charlotte Toronto Buffalo
San Francisco Los Angeles

IF YOU HAVE ANY PROBLEM OF SPOILAGE IN FOODS OR BEVERAGES WRITE US ABOUT

SEPCO

A non-toxic Fermentation Inhibitor

TASTELESS
ODORLESS
EFFECTIVE
NON-TOXIC

SETHNESS PRODUCTS COMPANY
1300 W. Division St. Chicago
—Also manufacturers of Caramel Color—

WHERE TO BUY

Featuring additional Equipment Materials and Supplies for the Food Processing Industries

PROFESSIONAL SERVICES

ARTHUR VAN HEEDEN
Consulting Chemist
Specializing in Development of Manufacturing Formulae and Processes for the Food Industries. Dehydration.
3500 South Ellis Avenue, Chicago

WHERE TO STORE FROZEN FOODS

FILTERS
FOR ALL PURPOSES
WRITE FOR DETAILS
Filtrine
MANUFACTURING COMPANY
53 Lexington Ave., Brooklyn, N.Y.

SCHWARZ LABORATORIES, INC.
Analysts . . Biologists . . Consultants
Foods, Beverages, Oils, Water and Vitamin Determinations
202 East 44 Street New York, N. Y.

THE NATIONAL COLD STORAGE CO., INC.
Facilities for All Perishable
FROZEN FOOD STOCKS
New York City Area Distribution Made Convenient by Using our
Brooklyn and Jersey City Warehouses
General Offices
60 Hudson St. New York, N. Y.
REctor 2-6590

POWERS TEMPERATURE and HUMIDITY CONTROL
Automatic Control
For Industrial Processes, Heating and Air Conditioning Systems, Hot Water Heaters and Shower Baths. Write for Bulletins.
Offices in 47 Cities
2893 Greenview Ave., Chicago, Ill.
THE POWERS REGULATOR CO

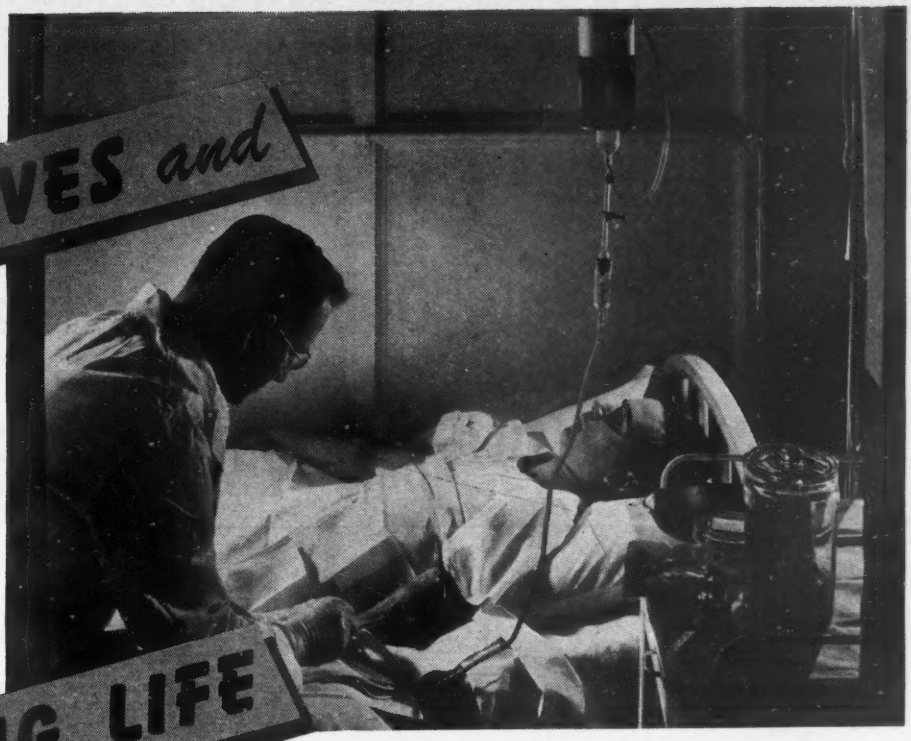
LANCASTER, ALLWINE & ROMMEL
Interesting booklet concerning Inventions, Patents, Trade-Marks and Copyrights, together with schedule of Government and Attorney's Fees, sent without obligation. Simply ask for "booklet and schedule."
Established 1915
Patents & Trade-Marks
Suite 457, 815—15th St., N. W., Washington, D. C.

"What Can It Do For Me?"

Advertising that is read with this thought in mind, may provide the solution to a problem that has kept you awake nights for weeks.
Remember, back of the signature of every Food Industries' advertiser is another organization, whose members have thought long and hard about your business in the course of introducing and applying their products and services to your industry.
If their offerings can improve the quality of your company's product . . . or save your company's money . . . they can contribute to your company's income.
Each month, Food Industries' advertisers, old and new, invite you and over 14,000 other readers to investigate further the advantages they can provide.

FOSTER D. SNELL, INC.
Our chemical, bacteriological, engineering and medical staff with completely equipped laboratories are prepared to render you Every Form of Chemical Service
Ask for copy of Bulletin 3W
302 Washington St. Brooklyn, N. Y.

QUAKER CITY COLD STORAGE CO.
PHILADELPHIA, PA.
3 WAREHOUSES 3
Proper Temperature For Frozen Foods



SAVING LIVES and SUSTAINING LIFE

. . . Credit High Vacuum Dehydration

An instant emergency transfusion of human blood plasma on a battlefront, thousands of miles from the donor.

A fresh tomato juice cocktail in the desert. A delicious glass of orange, lemon, grapefruit or pineapple juice with all its natural flavor, food value and health-protecting vitamins—across the world from where they were grown.

Hamburger steak that springs magically to life as red, juicy, tasty, fresh beef in an island jungle of the South Pacific that has never seen a refrigerator.

These are some of the wonders of high vacuum processing, today . . . of dehydration by sublimation from the frozen state under vacuum, measured in microns — conditions equivalent to the sub-stratosphere.

Stokes was privileged to assist in the development of this method—to engineer and build special vacuum equipment and high vacuum pumps which make possible the large-scale production of blood plasma and other labile biologicals so vital to the saving of lives.

Now, Stokes engineers are cooperating with food manufacturers, in applying this same method to the dehydration of various heat-sensitive food products — citrus and other fruit juices, broths, food extracts, fresh vegetables and meats.

Quality, flavor and vitamin content are retained. Volatile oils are stabilized. Products so dehydrated are readily reconstituted by the addition of water — juices and broths go into solution instantly. Then, too, drying such foods and reducing them to minimum bulk make it possible to save nine ships out of every ten in carrying these products to far-flung battle areas throughout the world. And they will keep indefinitely in any climate without refrigeration or other care.

Once more, Stokes pioneering is changing the shape of things to come.

Official U. S. Marine Corps Photo

F. J. STOKES MACHINE COMPANY

5976 Tabor Road Olney P. O. Philadelphia, Pa.

Representatives in New York, Chicago, Cincinnati, St. Louis

Pacific Coast Representative • L. H. Butcher Company, Inc.

F.J.Stokes · ENGINEERS · MANUFACTURERS FJS Est 1895

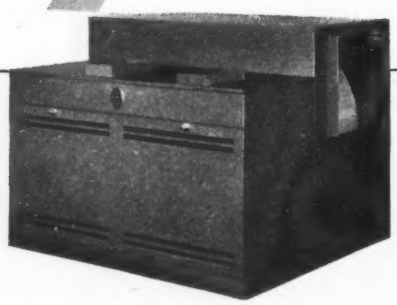
Here's How Bryant Helps to Put Your Dehydrated Foods on America's Postwar Shopping List

1 NATIONAL ADVERTISING — To tell your future consumers the advantages of dehydrated foods

2 FINAL-STAGE DRYING — The Bryant Dehumidifier provides dry air to assure a quality product, regardless of outdoor humidity

3 PREVENTION OF MOISTURE REGAIN — By proper humidity control in packing and storage rooms

4 COOPERATION — with your air conditioning engineer, or contractor in selection of your dehumidifying equipment



The BRYANT DEHUMIDIFIER

Dinner Party in Lunch Box Size

This is a picture of you, dear reader (or of the Mrs.) as you may look in 194X, bringing home the food for a dinner party of twelve!

How can there possibly be enough in that small package to feed twelve people? Easy! It's dehydrated food, with all water and air removed, condensed down to a fraction of its normal size. However, it will resume its normal appearance and retain its fresh, flavorful taste as you prepare it simply, easily and quickly in your own kitchen.

This is no dream. It's an actuality. But, practically one hundred per cent of the foodstuffs now being dehydrated are going abroad to feed our armed forces and our allies. Today, Uncle Sam is shipping meats, fruits, vegetables, even puddings, ice-cream mixes, coffee, flour and precooked cereals which have been dehydrated and compressed into units as small as cakes of yeast, many of them sufficient for six or more servings.

It has been one of the wartime jobs of Bryant engineers to develop and produce equipment* for certain dehydration processes in this magic transformation of foods which reduces packing, shipping and storage costs without loss of food values or flavors.

It will continue as one of Bryant's contributions to better living when the war drums beat no longer.

The Bryant Heater Company, Cleveland, Ohio

One of the Dresser Industries

***BRYANT DEHUMIDIFIERS SUPPLY VITAL DRY AIR**

Safe, scientific dehydration cannot be accomplished by heat alone, for high temperatures will break down cell formation of foodstuffs and cook out flavor. That is why food processors today are completing moisture removal by use of *dry* air, delivered by Bryant Dehumidifiers. This equipment assures elimination of moisture, guards against food spoilage, aids in retention of structure and flavor.

Bryant

Let the pup be your furnace man... and weather man, too!

THE FIRST NAME IN GAS HEATING AND AIR CONDITIONING

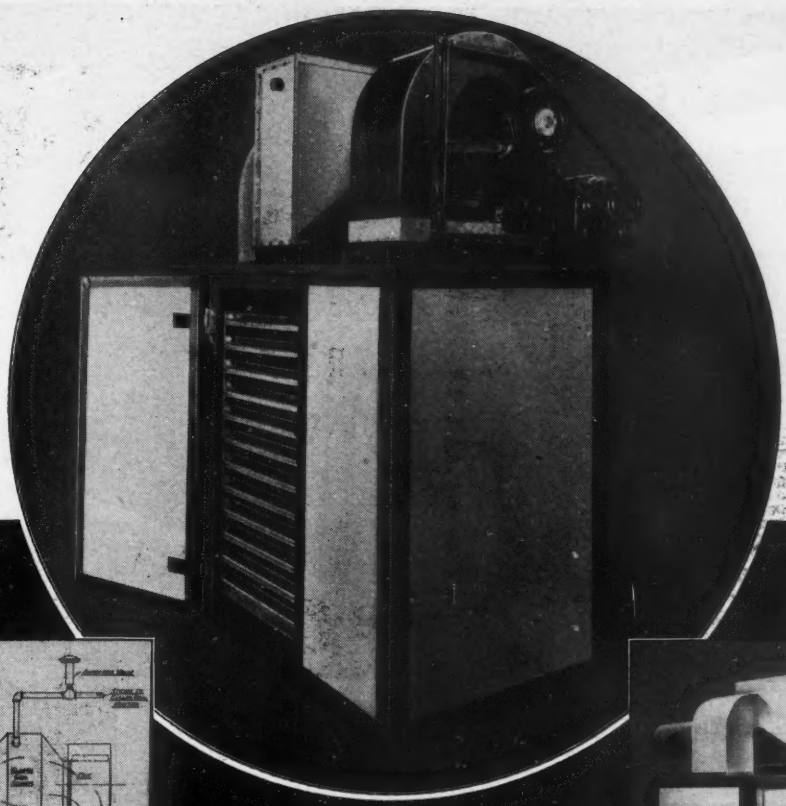
THIS IS A REPRODUCTION OF A BRYANT NATIONAL ADVERTISEMENT TELLING THE PUBLIC THE STORY OF DEHYDRATED FOODS

* A timely thought from

MAKERS OF

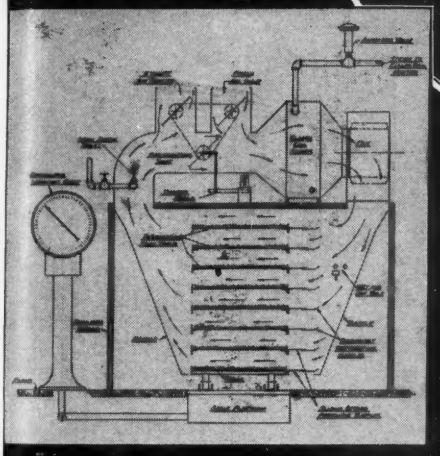
FOOD PROTECTION PAPERS

KALAMAZOO VEGETABLE PARCHMENT COMPANY
PARCHMENT · KALAMAZOO · MICHIGAN
BRANCH PLANTS IN PHILADELPHIA, PA., AND HOUSTON, TEXAS

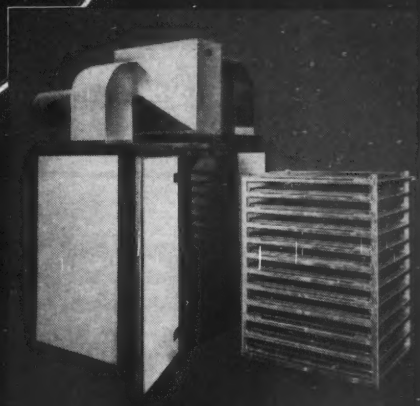


Unit for a New England packer of chowders, fish cakes, etc.

Cross section showing movable air ducts meshing with sides of trucks.



Showing truck ready to roll into chamber.



The Fleet Line

Something New and Better in DEHYDRATION!

THIS MACHINE is the first in a line of dehydration equipment which is being developed by our engineers. It reflects in its efficiency our many years of drying experience in other industries and the intensive research which we have more recently conducted in the food industry.

The cabinet type of machine shown here, made with capacities from 100 to 2000 lbs., provides a maximum flexibility. It is suitable for dehydrating fish chowder, clam chowder, ready-to-fry cod fish cakes, and many kinds of vegetables and meats in sliced, cube or string form. Changes in drying time or other operating conditions do not disrupt its production.

Food is placed on perforated trays in trucks, which roll into the dehydrating chamber on depressed tracks. Trucks fit flush against the back wall, and the front door and mesh on the sides with movable air ducts. Thus the air can not short circuit. It MUST pass over the food between the trays.

Drying time, temperature and humidity are automatically controlled in any combination desired. Circulating fans are variable speed to control volume of air.

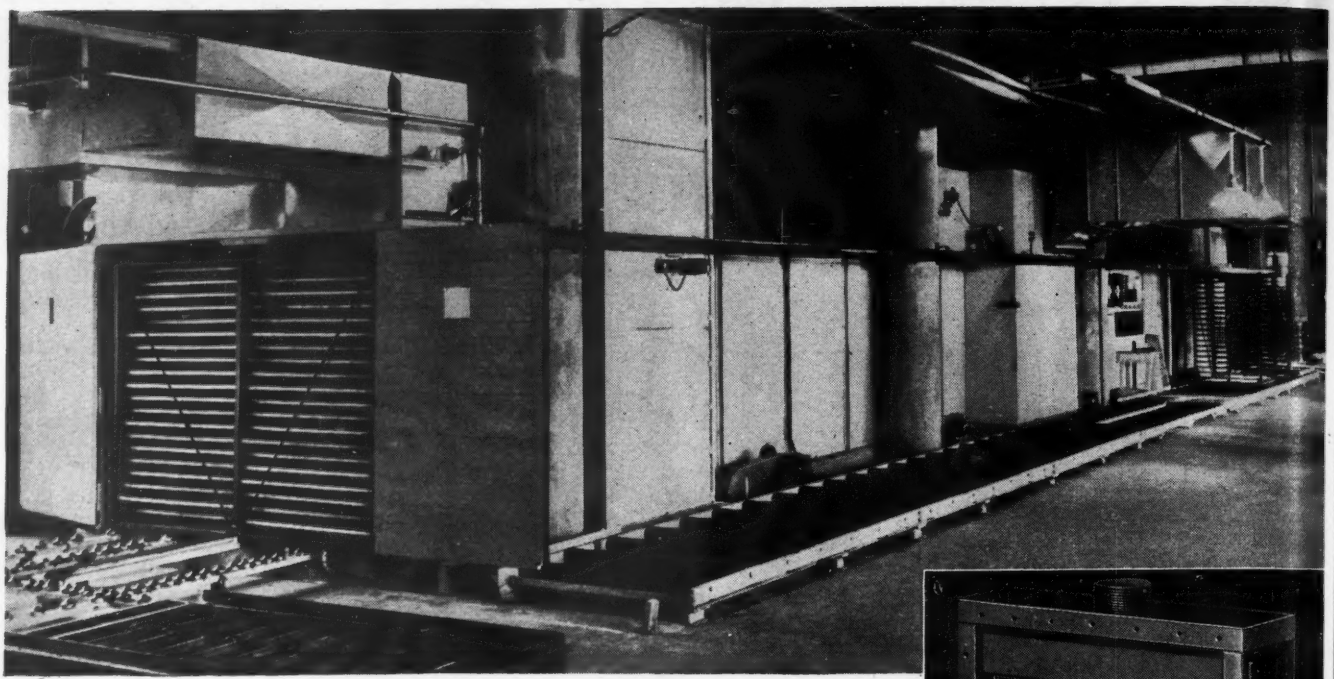
Further information on request.

FOOT OF SUFFOLK STREET

RIGGS AND LOMBARD

INCORPORATED

LOWELL, MASS.



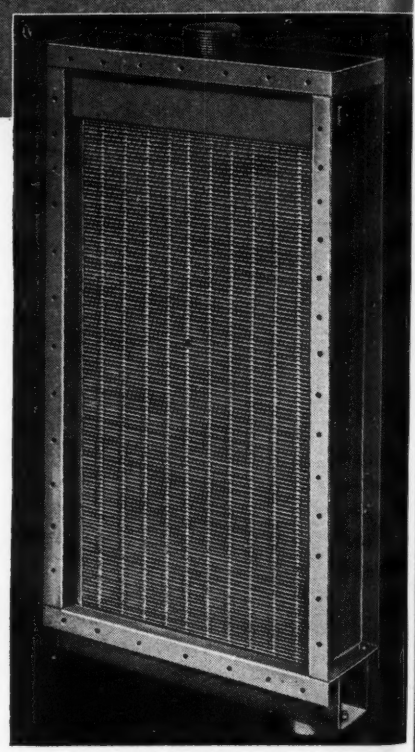
Dehydrator Tunnel in Beech-Nut Plant. Air heated by Modine Blast Heaters is introduced at each end, and part of air recirculated from center exhaust. Temperature and circulation of the air, humidity, and passage of trucks through tunnel are controlled automatically, on a pre-determined cycle.

BEECH-NUT

MODERN DEHYDRATING TUNNEL HAS

modine

BLAST HEATERS



Get Bulletins 342 and 342-A

★ The Beech-Nut Company's plant in Rochester, New York, has one of the most modern dehydration systems in the food processing industry.

Their tunnel dehydrator pictured here is being used for volume production of dehydrated carrots, beets, potatoes and other products for the Army. The air in this Beech-Nut dehydrator tunnel is heated with Modine Blast Heaters.

Modine Steel Blast Heaters are perfectly adapted for use in dehydrator tunnels because they are specially treated for resistance to rust and corrosion. Fins, tubes and headers are dipped in molten-lead alloy—to provide this protective coating so necessary in food processing.

Fins are *permanently* bonded to tubes *with metal*—preventing corrosion from forming between primary and secondary surfaces, which in turn would destroy heat transfer from tube to fin.

Heavy thick-walled steel tubes and heavy brazing enable condenser to resist differential expansion. "Floating" return header absorbs overall expansion.

A wide range of sizes and fin and tube combinations enable Modine Steel Coils to meet exacting heat transfer surface requirements.

Modine STEEL Coils and STEEL Unit Heaters are AVAILABLE TO INDUSTRIES DOING WAR WORK

Look in your phone book for Modine representative's name—"Where to Buy It" section under "Heating Apparatus."

MODINE MANUFACTURING COMPANY, 1822 RACINE STREET, RACINE, WISCONSIN

300 BILLION

dollars — or more for defense . . . but not one ?!☆ cent for tribute!

Those are HOTTMANN sentiments, and it is also why we are 100% back of Uncle Sam during the war, and when it is all over we'll be all out for supplying the mixing equipment to feed the millions wherever food is needed.

The distinguishing characteristic of HOTTMANN equipment is its efficiency. Every new feature that has been added to the betterment of food products has resulted from actual experience in one of the most up-to-date packing plants in the country.

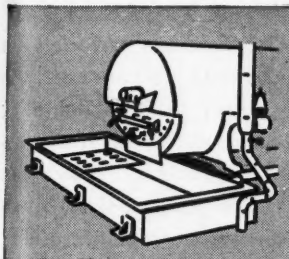
Better consult HOTTMANN before you buy new equipment because you will want to operate equipment that embodies the latest ideas based on war experience.

About Tomorrow's Problems

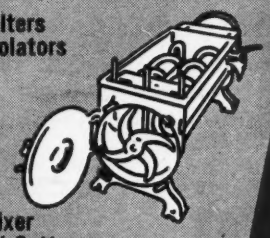
New problems in manufacture and improved methods in processing are certain in an America obligated to feed more millions of people than ever before in the post-war years. Let us help you plan, now, to work out tomorrow's mixing problems.

Put Your Mixing Problems up to

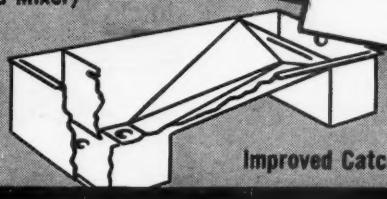
HOTTMANN



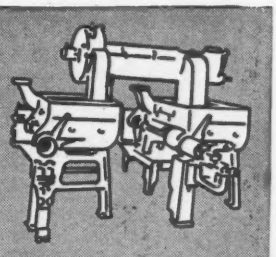
Fat Melters and Percolators



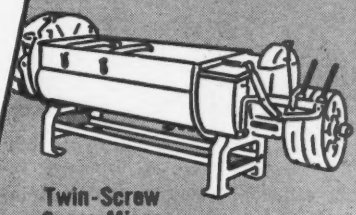
Kutmixer (Combined Cutter and Mixer)



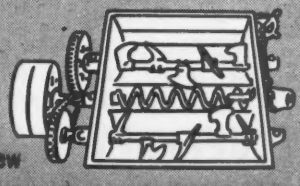
Improved Catch Basin



Yeast Machinery



Twin-Screw Super Mixer



Mixer, Interior view

THE HOTTMANN MACHINE COMPANY

3325-47 East Allen Street • Philadelphia, Penna.

"A Machine Is But the Lengthening Shadow of the Men Who Built It"

This fact is as sure as the sunrise: *No machine can be better than the men who built it.*

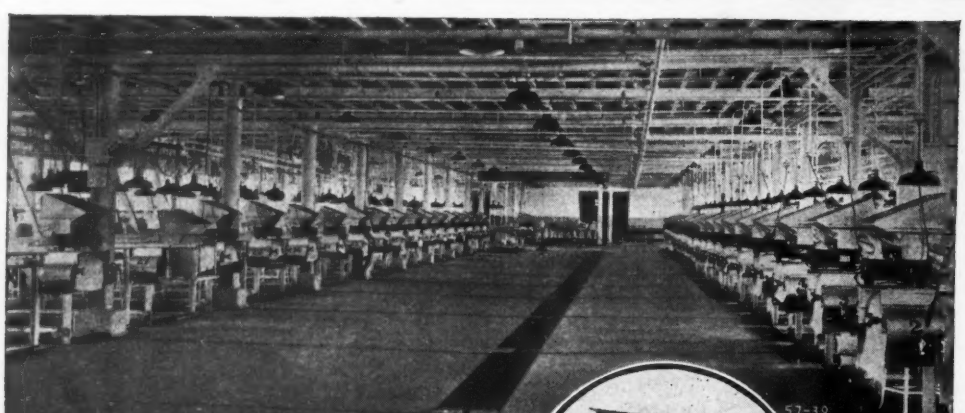
Their special abilities are worked into the raw materials, and emerge as the special abilities of the machine. Their special skills...their sincerity of purpose...their pride of craftsmanship—all are unmistakably stamped on the finished product.

That is why we believe that BAKER refrigerating machines stand unequalled in the refrigerating machinery world. For, in the BAKER shops are men who place pride of craftsmanship above all else...who build each machine individually, painstakingly, thoroughly...who shun hasty methods so that they may build the finest machine their hands are capable of.

Thus does each BAKER machine bear the mark of men who have built it to perfection. And thus do BAKER refrigerating machines year after year perform so reliably that all over the world the name BAKER has come to mean *true dependability.*

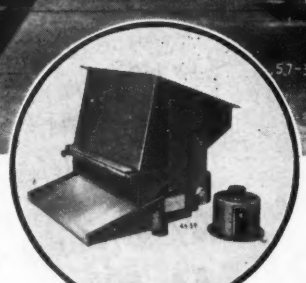
BAKER ICE MACHINE CO., INC., OMAHA, NEBR.

BAKER COMMERCIAL AND INDUSTRIAL REFRIGERATION



A battery of 43 Jeffrey-Traylor electric vibrating spreader feeders are shown in installation view above. They are discharging to inspection belts in large frozen food plant. Moisture-proof stators on these vibrators permit washing and cleaning without damage to the units.

Send for our new
Jeffrey-Traylor Catalog No. 750-E
—it goes into detail

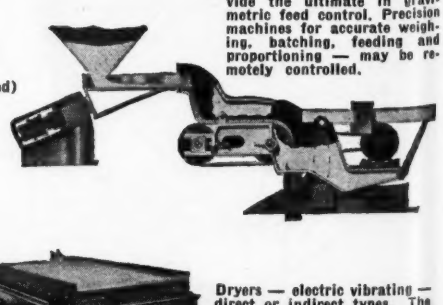


A close-up of the J-T No. 2-A spreader is shown in circle. It has hopper and controller which permits regulating capacity from zero to maximum.

IMPROVE HANDLING SPEED PRODUCTION

From the time raw materials are received until they are ready to ship, Jeffrey material handling units are useful all the way. Chains, sprockets, conveyors, feeders, dryers, coolers, packers, washers, portables, crushers, pulverizers, elevators . . . all designed to improve handling methods and for increasing production efficiency.

(Patented)



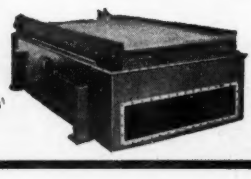
Jeffrey Waytrols (below) provide the ultimate in gravimetric feed control. Precision machines for accurate weighing, batching, feeding and proportioning — may be remotely controlled.

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

927-99 North Fourth Street — **Columbus, Ohio**

Baltimore	Chicago	Detroit	Milwaukee	Salt Lake City
Birmingham	Cincinnati	Harlan	New York	Scranton
Boston	Cleveland	Houston	Philadelphia	St. Louis
Buffalo	Denver	Huntington	Pittsburgh	



Dryers — electric vibrating — direct or indirect types. The ultimate in flexibility, automatic control and cleanliness. A direct type Jeffrey-Traylor dryer is shown at left — has louvered conveying surface. Also electric vibrating coolers.

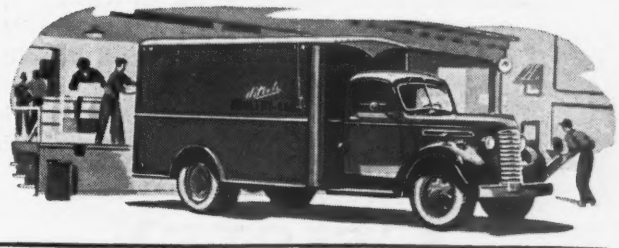
HIGHWAY TRANSPORT... VITAL TO VICTORY AND THE AMERICAN WAY OF LIFE

No Breakfasts like this in Berlin

What American would trade a breakfast like this for Germany's ersatz or Japan's boiled rice? True, some of our foods are rationed — but there are still no meals like ours in any of the Axis countries. Farmers are working overtime to produce our food. Truck operators are working night and day to transport it.

More than one-fourth of all the nation's trucks are on the farm. 70% of our pigs go to leading markets by truck. Sixteen of our largest poultry-shipping centers receive 65% of their eggs by truck. Twenty of our biggest cities depend upon trucks for their entire supply of milk.

Virtually everything we eat, wear or use moves by motor truck during some stage of its travel from producer to consumer.



Joseph B. Eastman, director of the Office of Defense Transportation, recently stated: ***"Automotive Transportation is absolutely essential to the winning of the War. Goods must reach their destinations and workers must get to their jobs . . . on time."*** Join the U. S. Truck Conservation Corps and keep your trucks in best possible condition. Your GMC dealer is pledged to help you.

Pledged U.S. TRUCK CONSERVATION CORPS

INVEST IN VICTORY . . . BUY WAR BONDS AND STAMPS

GENERAL MOTORS TRUCK & COACH

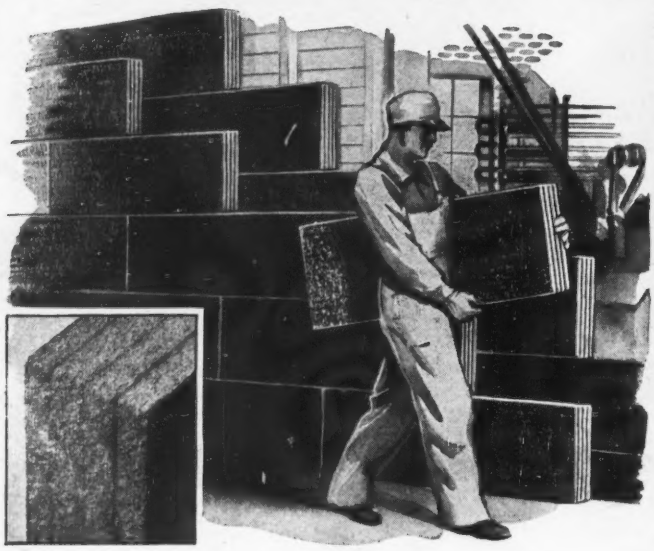
DIVISION OF YELLOW TRUCK & COACH MANUFACTURING COMPANY

Home of GMC Trucks and Yellow Coaches . . . Manufacturer of a Wide Variety of Military Vehicles for our Armed Forces

How the Army and Navy

SOLVE FREEZER PROBLEMS WITH

A NEW KIND OF INSULATION!



CELO-BLOCK

Low Density, High Efficiency Insulation Offers Important Advantages

MANY Army and Navy installations have established the value of Celotex CELO-BLOCK low-density, high-efficiency cold storage insulation. This new product simplifies insulation problems because it is guarded against moisture penetration by an asphalt exterior coating *plus* moisture barriers spaced every half inch through the material.

CELO-BLOCK is light in weight and handles easily. It can't chip or crumble; won't break if dropped. Shipped in cartons with special corner protection, its arrival on the job in undamaged condition is assured, which makes for fast application. And it is available now! Mail the coupon!

CELOTEX
REG. U. S. PAT. OFF.

CELO-BLOCK
TRADE MARK

COLD STORAGE INSULATION

THE CELOTEX CORPORATION • CHICAGO

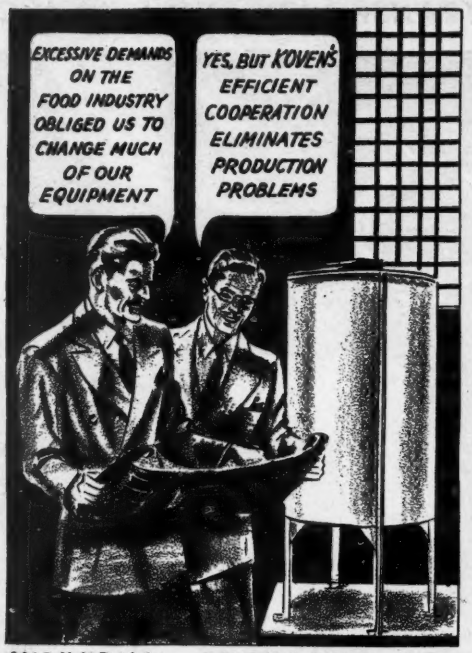
THE CELOTEX CORPORATION, CHICAGO FI 7-43

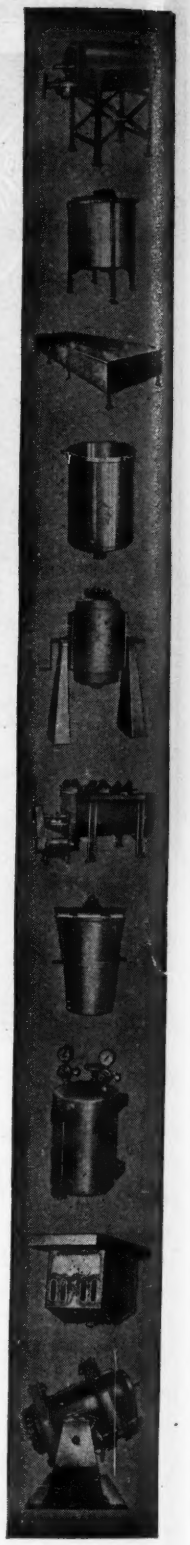
Please send complete information on Celotex CELO-BLOCK Cold Storage Insulation.

Name .....

Address ..... *City* .....

County ..... *State* .....


EXCESSIVE DEMANDS ON THE FOOD INDUSTRY OBLIGED US TO CHANGE MUCH OF OUR EQUIPMENT
YES, BUT KOVEN'S EFFICIENT COOPERATION ELIMINATES PRODUCTION PROBLEMS



INDIVIDUAL PROBLEMS ARE ECONOMICALLY SOLVED With SPECIALLY BUILT KOVENIZED EQUIPMENT

During the past years, the food industry has undergone vast changes. Manufacturers have discovered dehydration of foods — and discovered also, *new* equipment needs. The food manufacturers meet these demands with KOVENIZED equipment. They know that the increasing amount of food consumption must be met without profit-losing stoppages or inefficient production.

That is why food manufacturers turn to KOVEN with their special, individualized requirements. They know KOVEN'S experienced engineers will satisfy their desire for modern equipment, built to meet their specific needs, and economical production.

Our engineers will gladly consult with you about your own equipment problems. An appointment obligates you in no way. Call or write KOVEN today.

Among the many KOVEN products:

- Stainless Steel
- Aluminum Sheet Fabrication
- Boxes, Tote, Waste Cans
- Chemical Apparatus
- Coils and Pipe Bands
- Copper Sheet Fabrication
- Galvanizing Work
- Mixers, All Kinds
- Monel Metal Fabricator
- Pails, Special Heavy
- Pans, All Types, All Metals
- Sinks, Sullery and Factory
- Tables, Galvanized or Monel
- Tanks, All Types, All Metals
- Kettles, All Types, All Metals

WATERFILM Industrial Heating Boilers

PLANTS:
Jersey City, N. J. Dover, N. J.

L. O. KOVEN & BRO. INC.

154 Ogden Ave.
Jersey City, N. J.

Insert shows two sides of fresh pork and their equivalent in cans of dehydrated meat plus lard in pound packages. The fresh sides are cut Wiltshire Style to show form in which pork went to England in World War I. Scientific processing and packaging saves space and conserves material in doing the same supply job today.

Brown Temperature Controllers

Temperature Controls for Meat

DEHYDRATION

FROM Swift & Company, Chicago, *dehydrated* pork is sent East and West, under Lend-Lease to our United Nations Allies.

At Swift & Company, dehydration of meat is a continuous process in which temperatures are held within defined limits so as to reduce the opportunity for bacterial development and at the same time, retain the maximum nutritional value of the product.

Temperature, the critical factor in the slow-drying process (dehydrating) is controlled by Brown Dual Air-Operated Thermometer Controllers (shown above at the right). These highly accurate instruments measure, record and control the various temperatures of the Rotary Dryers (Link-Belt Roto-Louvre). As the meat enters the dryers, it has approximately 50% moisture content at a temperature of approximately 155° F. Near the middle of the dryer, temperature of the meat is maintained at about 135° F. At the discharge end of the dryer, temperatures range from 145 to 155° F. and the moisture content averages 6 to 10% upon discharge from the dryer.

Brown and Minneapolis-Honeywell engineers are working closely with companies engaged in the dehydration of food products. Their wide experience in the application of temperature controls in the food industries qualifies them to recommend the correct instruments to safeguard and maintain uniform quality in the dehydration of foods. They will be glad to call at your plant without obligation.

In purchasing dehydration equipment ask for Brown and Minneapolis-Honeywell Controls. Catalogs sent on request. Write THE BROWN INSTRUMENT COMPANY, 4502 Wayne Avenue, Philadelphia, Pennsylvania, a division of Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota. Offices in all principal cities. 119 Peter Street, Toronto, Canada—Wadsworth Road, Perivale, Middlesex, England—Nybrokajen 7, Stockholm, Sweden.

Instruments by **BROWN** *and Controls by*

MINNEAPOLIS-HONEYWELL

INSIDE NEWS

JULY PREPARED BY NATIONAL CAN CORPORATION, NEW YORK, N. Y. 1943

Not diamonds, but chunks of alkyd resins which may be used in emulsions to coat many surfaces in place of paints.

Alkyd Resins in New Emulsions

Alkyd resins, the prototypes of which are the reaction products of glycerine and phthalic anhydride or acid, are finding new fields of usefulness in the form of emulsions. Although known for some time, it is only during the last year or so that these resins have really begun to come into their own. Their use not only cuts down the need for vital solvents, but these emulsions also have many other advantageous properties to recommend their use.

According to a government text on synthetic resins, alkyd-resin emulsions are especially suitable for coating porous surfaces such as brick, concrete, plaster, stucco and masonry of all kinds. Since they allow the curing of the plaster to continue, alkyd-resin-emulsion coatings may be applied directly over fresh plaster without a sizing coat. Moreover, the usual pigments may be incorporated. Applied by brushing or spraying, they dry quickly and combine the ease of application of water paints with the durability, washability and hardness of oil paints. (380)

Brazil's Rubber Transport Problem to be Aided by Parachute "Task Force"

Brazilian and United States engineers are aiming to develop to the maximum the rubber-growing possibilities of the almost impenetrable jungle areas of the Amazon Basin. This was recently revealed when a spokesman for the United States Secretary of Commerce declared that a "task force" will drop men by parachute into jungle rubber areas from planes based on Manaos, the 273-year-old capital of the vast State of Amazonas. Flying prospectors, armed with machetes and food, will "bail out". Trails will be broken to the nearest river and the clearing enlarged to the size of a landing field. The planes will then come in and actual operation of tapping rubber trees will begin. (381)

Propylene Glycol for Cigarettes

Canadian cigarette smokers who have been complaining about tobacco dryness resulting from the elimination of glycerine, aromatic oils and other critical war materials, as well as cellophane wrappings, are welcoming the news that propylene glycol, not on the critical list, will be used in the future to case the tobacco and keep it moist. Glycerine supplies saved by the use of glycol will be made available for the manufacture of cellophane to wrap and insulate the packages as a further protection. Cigarettes to be shipped overseas to the armed forces will be given the glycol treatment and a fair portion of cigarettes for civilian consumption will also be so treated. (382)

Oil Treatment Reduces Corn Infestation

Although no economical way yet has been found to treat canning corn against corn earworm infestation, tests made in Nebraska indicate a treatment which is practicable for fresh market corn and which canners or seedsmen who grow costly hybrid corn for seed might adopt. The methods produced yields which were around 80% free of infestation while untreated plots yielded only around 32%.

The treatment consisted of individual ear treatment with mineral oil and mineral oil and insecticide mixtures. The oil was injected into the silks of the ear with an automatic ejector oil can.

Oil used was mineral oil of viscosity 200 degrees Saybolt. Treatments were (1) oil alone, (2) oil of the same quality with viscosity of 100 plus 0.2% pyrethrins, (3) 100 viscosity oil plus 2% dichloroethyl ether and (4) clipping of silks immediately after fertilization was completed.

Average percentage of worm-free ears after harvest for each method was as follows: (1) 67.3%, (2) 81%, (3) 78.3%, (4) 36.5% and untreated check 32.6%. (383)

Molds Vs. Guinea Pigs In Vitamin Tests

Molds can now be made to substitute for animals in making tests to determine vitamin content for food. By using the molds according to a method reported recently by a university biologist, vitamin analysis can be speeded up.

Molds and bacteria propogate faster than the usual laboratory animal specimens—guinea pigs, rats and the like, and the new technique permits molds to be "conditioned" for determining a particular vitamin. Most of the micro-organisms used can manufacture their own vitamins, but there is one particular kind they cannot make, it was reported. Therefore, when the culture is placed in the food which is to be tested for that particular vitamin, the amount of vitamin present is proportional to the rate of growth of the mold.

Because of a shortage of the particular molds that were deficient in the single vitamin, scientists worked out a method of "conditioning" the mold varities for work with thiamin, riboflavin, nicotinic acid, pantothenic acid or biotin. For example, the mold strain is exposed to ultra-violet or X-rays in the presence of thiamin and after awhile it can no longer live without added thiamin and can be used to test for this vitamin. Once so "conditioned", the strain retains the weakness, for something apparently happens to the genes. (384)

NATIONAL CAN

PLANTS: NEW YORK • BOSTON • BALTIMORE • CHICAGO • HAMILTON, OHIO • FORT WAYNE, INDIANA

Mold Check For Bread

The chemist checks nature at one point by delaying the growth of unwanted organisms—the molds that flourish on bread in warm humid weather. Approximately three billion loaves of bread for civilians and soldiers will be protected this year against mold and against a microbial growth known as "rope" by the addition of "Mycoban" propionate salts. This product, manufactured by chemical means, is the same as that which occurs as a natural ingredient in certain foods, such as vinegar, Swiss cheese and other milk-derived products. Two or three ounces added to the dough for 100 loaves will delay the development of mold for several days, allowing ample time for delivery and consumption of bread. It in no way affects taste, texture or appearance. "Mycoban" is also used to inhibit mold growth in pies, cakes and butter. In the case of butter the inhibitor is incorporated into the parchment wrapping and thus protects the surface of the butter, where the mold usually flourishes. (385)

So Those Who Fly May See

National Can makes this small container to hold fog-proof paste for use on goggles, windshields, gas masks and other equipment, in order to assure clear vision for our military pilots, observers, machine gunners and other troops. It is another example of how industry on the home-front can contribute to victory on the battle-front. (386)

Substitutes For Stoppers

The South African Forest Products Institute has found several domestic woods that can be used as substitutes for corks and rubber stoppers, the British press reports. Corkwood, mgoma and sanga are suitable for this purpose, it is said. The woods are first compressed and then soaked in water for several hours to restore them to their original volume. (387)

Technical Topics

PETHIDINE has been found comparable to codeine for relieving pains due to wounds in British research. Chemically, pethidine is said to be the hydrochloride of the ethyl ester of 1-methyl-4-phenylpiperidine-4-carboxylic acid. It may be administered by mouth, intravenously, intramuscularly or subcutaneously. (388)

AMINOACRIDINE and DIAMINOACRIDINE was said to be non-staining, while the the newest antiseptic dyes. The 2:7-diaminoacridine is declared to be as active as proflavine but of lower toxcity. Aminoacridine was said to be non-staining, while the diaminoacridine stains the skin pink. (389)

ORTHO-AMINODICYCLOHEXYL production in experimental quantities has been started by an American manufacturer. The material is declared to be a strong, primary amine and to be indicated in reactions where an essentially water-insoluble amine is required. (390)

PHENOTHIAZIN and related compounds have been found to induce various degrees of anemia when fed to mice in recent Canadian investigations. The anemia is accompanied by the appearance in the blood of refractive globular bodies attached to the red cells. Sulfonamides may also cause the formation of the bodies, it was found, though to a lesser degree than the thiazines. (391)

UREA is being employed in Britain to a considerable extent in the timber trade. It is used to prevent the splitting of timber during seasoning or drying and also for the treatment of wood so that it can be bent or shaped for various purposes. (392)

TOBACCO FAT is employed to produce a soap in development work now being carried on by an American agricultural experiment station. A number of other interesting products are also said to have been obtained from low grade tobacco, including an oil extracted from tobacco seed. (393)

GUM GUAIAC PRESERVES FOOD—Gum guaiac is being used extensively in the preservation of considerable quantities of food for the armed forces. The juice, which prevents fats from becoming rancid or from losing their palatability, is used in meats, but it will also be used with dehydrated fruits and vegetables. Paper wrapping of fatty foods will also be impregnated with guaiac juice to prevent the fats from soaking through. (394)

ASCORBIC ACID DETERMINATION by an improved photoelectric method was described in a recent British scientific journal. In the process an excess of dichlorophenol-indophenol is added to the extract containing ascorbic acid, and the unreduced dye subsequently removed with chloroform. The photoelectric measurements are then made on the chloroform solution obtained. (395)

SILICA GEL is finding increased use as a drying agent for industrial gases in Germany, according to a report in a chemical journal from that country. In a process described the gas to be dried is passed upward through a column of fine-pored gel. The absorbing towers are usually operated in pairs, one being regenerated with heat while the other is actively functioning. (396)

CELLULOSE PRODUCTION from straw was comprehensively described in a recent British chemical publication. A pilot plant employing the Pomilio process was said to now be operating on a twenty-four hour schedule. The straw pulp is consumed in the manufacture of special papers. (397)

RESINOUS RUBBER ISOMERS suitable for making coating compositions of various kinds can be made by treating rubber with phenols and certain acids or isomerizing salts it is revealed in a recent British patent. In the form of solutions or emulsions the isomers are suggested for use in making coatings for wires, films and foils, as binding agents for coating masses and as molding compositions. (398)

SEAWEED is being used for the production of artificial fibers in experimental work under way at an English university. The products are declared to resemble various types of rayon. (399)

Every effort will be made to furnish additional information on these articles. Where such information is not obtainable, we will refer inquiries to the original source of the article. Write to National Can Corporation, 110 East 42nd Street, New York City. Please mention the number at end of article—also name of the magazine you saw it in.

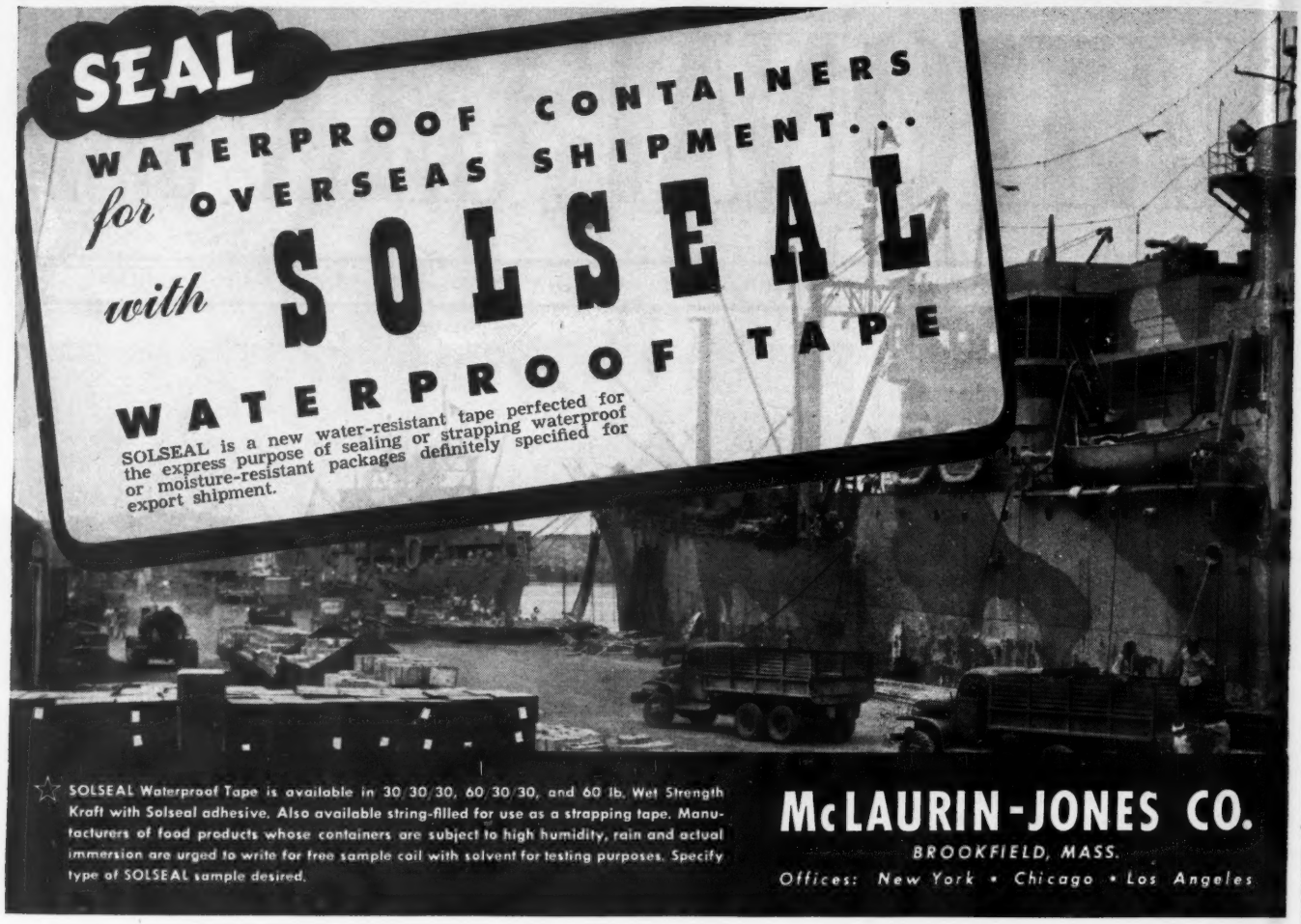
NATIONAL CAN CORPORATION

Manufacturers of

SANITARY PACKERS CANS • PLAIN AND LITHOGRAPHED CANS FOR FOODS, DRUGS, OILS, PAINTS, VARNISHES • STEEL DRUMS AND PAILS

Deliveries Subject to Priority Ratings

(*Advertisement*)


SEAL
WATERPROOF CONTAINERS
for OVERSEAS SHIPMENT...
with SOLSEAL
WATERPROOF TAPE
SOLSEAL is a new water-resistant tape perfected for the express purpose of sealing or strapping waterproof or moisture-resistant packages definitely specified for export shipment.

☆ SOLSEAL Waterproof Tape is available in 30/30/30, 60/30/30, and 60 lb. Wet Strength Kraft with Solseal adhesive. Also available string-filled for use as a strapping tape. Manufacturers of food products whose containers are subject to high humidity, rain and actual immersion are urged to write for free sample coil with solvent for testing purposes. Specify type of SOLSEAL sample desired.

McLAURIN-JONES CO.
BROOKFIELD, MASS.
Offices: New York • Chicago • Los Angeles

Important NEWS for DEHYDRATORS

Milk Plants and other Steam Users

- **SAVE *fuel and water***
- **INCREASE *production***
- **LOWER *operating costs***

ACKER

DEAERATING AND EQUALIZING SYSTEM

Get the facts fully explained and detailed in our bulletin 2-E-41. Complete description of the unit and its component parts, the simplicity of construction and the adaptation of practical engineering are fully covered in this bulletin.

W. M. ACKER ORGANIZATION, INC.
3169 FULTON ROAD . . . CLEVELAND, OHIO

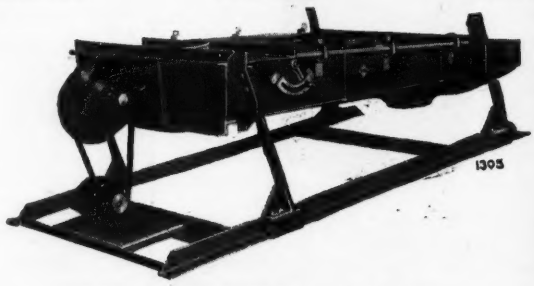
SEND COUPON TODAY!

W. M. ACKER ORGANIZATION, INC., 3169 FULTON ROAD, CLEVELAND, O.
Please send me bulletin on ACKER Deaerating and Equalizing System.

NAME .....
COMPANY .....
STREET .....
CITY ..... STATE .....

'Snappy'

CLEANER SIFTER
GRADER DRESSER BOLTER



Quick Sieving

Double-action. Triple capacity. Incredibly fast for all bulky, fluffy or hard-to-sieve materials . . . Simple, safe, attentionless operation . . . Small space, trivial power . . . Easily, cheaply installed . . . Made in several sizes.

Ask for Data 1-404

S. HOWES CO., INC., EUREKA **Silver Creek, N. Y.**

His book DOESN'T tell ALL

REX Mechanical Engineering—Rex M. E.—designs and manufactures more than 2000 *standard* types and sizes of chain belts.

This 768-page catalog does not include the many special chain belts and adaptations which Rex M. E. has been, and is, designing and producing for machine designers and maintenance superintendents.

Where corrosion was the problem, Rex M. E. recommended a special chain belt of Z-Metal. Standard chain belt might have been satisfactory for a time, but the special application was sure to give far longer and more efficient service.

When a chain belt with a 200-ton pull and an ultimate strength of 1,500,000 pounds was needed, Rex M.E. designed and produced it.

For a continuously operating drive requiring speed beyond the highest standard range, he provided "step-up" improvements in an otherwise standard chain belt.

For an exceedingly complex installation in which the space limitations were an important factor, he collaborated with the designer to work out a special chain belt installation, meeting every requirement of design and service.

For this service, Rex M. E. maintains a field organization. Many of its members served their apprenticeship in his drafting rooms and plants. For additional counsel the territorial men call on designing engineers in Milwaukee who have the advantages of national experience.

Through the work of all of these men in many fields, Rex M. E. is constantly learning—and making available—much that is helpful in the great work in which all engineers are always engaged, namely, to achieve a maximal result at minimal cost and waste.

For complete information, see your Rex Man or write Chain Belt Company, 1616 W. Bruce Street, Milwaukee, Wis.

REX **CHAIN BELTS**

In more than 2000 sizes and types for transmitting power, timing operations, and handling materials

CHAIN BELT COMPANY OF MILWAUKEE

INCREASE YOUR PRESENT REFRIGERATION CAPACITY WITHOUT ADDING COMPRESSORS

PATENTED

● The NIAGARA "No-Frost" Method eliminates the progressive icing of refrigeration coils with the attendant loss of refrigeration. It enables you to refrigerate additional space without adding to compressor load —or to save power in present operation.

In addition, the Niagara DUO-PASS AERO CONDENSER increases refrigeration capacity by reducing head pressures. This has been proved by users' power costs reduced as much as 35% when the use of refrigeration capacity was not increased.

Save power and money, or increase refrigerated space by using these machines. For ample assurance of these benefits write for information on users' experience and for Niagara Bulletins 83, 91 and 95. Dept. FI-73

NIAGARA BLOWER COMPANY

General Sales Office: 6 E. 45th Street, New York City

37 W. Van Buren St., Chicago — Fourth & Cherry Bldg. Seattle

District Engineers in Principal Cities

NIAGARA INDUSTRIAL COOLING • HEATING • DRYING HUMIDIFYING • AIR ENGINEERING EQUIPMENT

Chain Link — *Flat Wire*

STEADY MOVEMENT ASSURED

. . . when you use these sturdy conveyor belts!

U·S·S CYCLONE Metal Conveyor Belts help you keep goods moving—without the breaks and other troubles that cause production bottlenecks. They are flexible. Amazingly strong. They are unharmed by water and steam. Porous and sanitary, they are ideal for handling of many materials, particularly foods. Available in Flat Wire and Chain Link types—in a variety of openings and widths. Write us for further information and prices.

CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
Waukegan, Illinois · *Branches in principal cities*
United States Steel Export Company, New York

CYCLONE *Metal Conveyor Belts* — UNITED STATES STEEL

MERCOID

DA

double adjustment.

Temperature or Pressure

AUTOMATIC CONTROLS

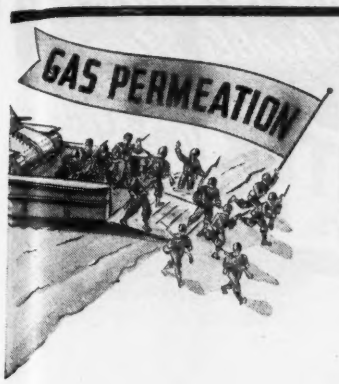
USED IN REFRIGERATION AND DEHYDRATION OF FOOD PROCESSING

Mercoid DA Controls have attained universal use throughout industry. They are adaptable to a wide range of applications and available in a variety of types to meet the demands for accurate control of temperature and pressure.

The distinctive features in Mercoid DA Controls are the corrosion and dust-proof mercury switch; the Bourdon tube actuating element, and the outside double adjustment, which makes it easy even for inexperienced workers to set the operating range of these controls. The direct reading eliminates calculations.

Complete information in catalog No. 600. Write for a copy.

THE MERCOID CORPORATION, 4203 W. Belmont Ave., Chicago, Ill.



OVER-WRAPS

TO RESIST "FOREIGN INVASION"

OVER-WRAPS PROTECT VARIED PACKAGES

Compressed "briquettes" of dehydrated food are fully protected by proper over-wrapping . . . Soup-mix cartons, destination overseas, use the sure protection and faster packaging of over-wraps . . . Cigarette cartons for export are individually wrapped in a special laminated over-wrapper to perserve freshness.

Send for our "Wartime Packaging" booklet.

WARTIME Packaging finds added protection in over-wrapping. It's a versatile method. The required degree of protection and the proper amount of resistance to handling can be built into the single sheets or laminated papers which you specify for over-wrapping. And it's practical. Fits readily into production, takes minimum attention on packaging lines. The paper-making resources and the experience of Menasha in making and applying over-wraps is ready to tackle your special job.

WAR PRODUCTS DIVISION
THE MENASHA PRODUCTS CO.
Division of Marathon Paper Mills Co.
MENASHA, WISCONSIN

MENASHA PRODUCTS
CARTONS, LINERS
BAGS AND OVERWRAPS

The First Book On This Important New Industry!

DRYING AND DEHYDRATION OF FOODS

By H. W. VON LOESECKE
Dehydration Committee of the U. S. Dept. of Agriculture

With a foreword by
Robert S. Hollingshead
U. S. Dept. of Agriculture

HERE is a book everyone in the food industry can read with profit because it presents in condensed readable form a fund of practical information on the dehydration of food products.

The importance of this rapidly-growing industry, in which more than $110,000,000 is already invested in the United States alone, can hardly be overestimated. Spurred by wartime needs, the drying and dehydration of scores of food products now play a vital part in our national nutrition program. However, dehydrated foods are here to stay and will assuredly assume an equally important place in our post-war economy.

It becomes imperative that forward-looking people in the food field understand the processes and possibilities of dehydrated foods. Therefore, whether you are interested in dehydrating on a large or small scale, or merely want to know the potentialities of this rapidly growing industry, here are the facts you need, backed by the first-hand experience and intense research of the author.

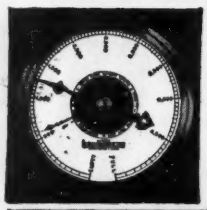
In a succession of condensed, informative chapters it discusses the various steps involved; the types of equipment used for each, with all pertinent details; the dehydration of vegetables, dairy products, fish, and meats, including specific figures for moisture content, yield, processing losses and drying temperatures; plant sanitation problems; factory costs; nutritional aspects of the subject; and packaging and storage. A large number of illustrations are included.

300 pages **Profusely illustrated** **$4.25**

REINHOLD PUBLISHING CORP.
330 W. 42nd St. **New York, N. Y.**

We Don't Grope Blindly When Measuring Valuable Stored Liquids... We Check With
LIQUIDOMETER Tank Gauges
"THEY'RE ALWAYS DEPENDABLE"

Now, more than ever, industrialists realize the importance of having accurate measurements of their stored liquids available at all times. LIQUIDOMETER Tank Gauges insure true, convenient, hazard-free, 100% automatic readings. No pumps, valves, or auxiliary units required to read them. Models are available so that readings can be taken remotely from or directly at the tank. Remote reading types utilize balanced hydraulic transmission system which completely compensates for temperature variations on communicating tubing. Accuracy unaffected by specific gravity of tank liquid.



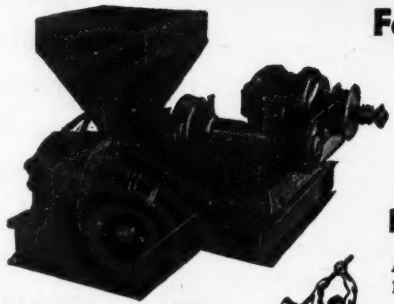
Approved for gauging hazardous liquids by Underwriters' Laboratories and similar groups.

Models available to automatically control pumps, motors, signals or other devices for maintaining minimum or maximum liquid levels.

Write for complete details

THE **LIQUIDOMETER** CORP.
38-14 SKILLMAN AVE., LONG ISLAND CITY, N.Y.

GRUENDLER CRAFTSMANSHIP
Employed by U.S.A. in the WAR EFFORT



Food Processing Equipment

Meeting Different Products and Capacity Requirements

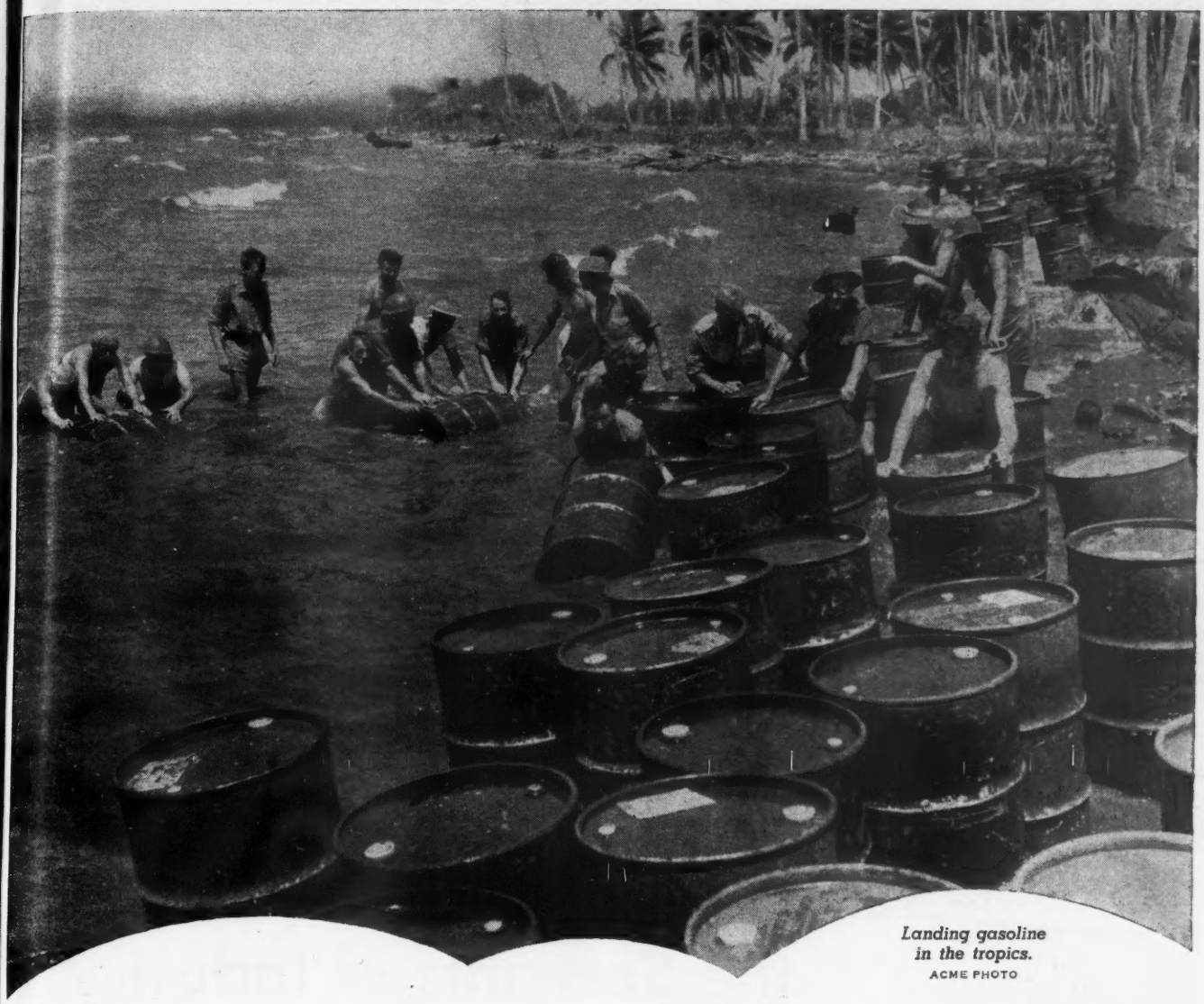
MASTER PULVERIZER

Adjustable from 30 mesh to 100 mesh and finer—a most popular type of pulverizer for food products, cocoa, sugar, grains, spices, whole wheat flour grains, etc.—Write our Engineers.

"DUSTLESS OPERATION"
Requiring no auxiliary separators, fans or collection attachments. "Built in Many Sizes"
"Illustrated Bulletin on Request"

GRUENDLER
ST. LOUIS, U.S.A.
GRUENDLER

GRUENDLER CRUSHER & PULVERIZER CO.
PLANT and MAIN OFFICE—2915-17 N. MARKET • ST. LOUIS, MO.



Landing gasoline in the tropics.
ACME PHOTO

STEEL CONTAINERS GIVE POSITIVE PROTECTION TO CONTENTS

Wartime shipping must be packed to withstand irregular handling—unavoidable delays in loading—inadequate facilities at unloading points. It is often necessary to store war materials such as foods, munitions and gasoline in the open where they are subject to attack by destructive elements. Steel containers provide positive protection of contents under all conditions.

Steel pails and drums
3 gal. to 55 gal. capacities.

INLAND STEEL CONTAINER CO.

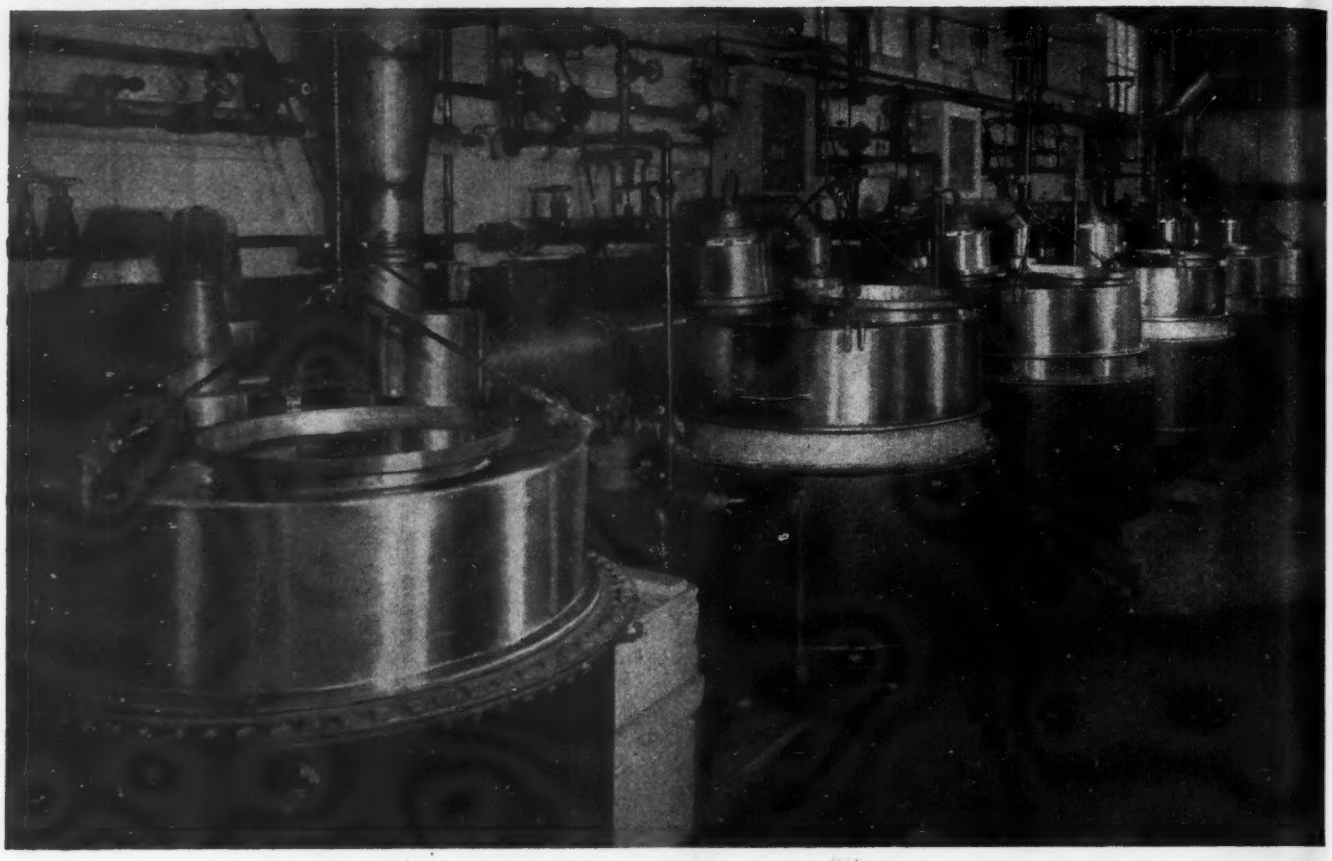
Formerly WILSON & BENNETT MANUFACTURING COMPANY

6532 S. MENARD AVE. CHICAGO, ILLINOIS

Plants at Chicago—Jersey City—New Orleans—Richmond, Calif.

Sales offices in all principal cities

CONTAINER SPECIALISTS



Stainless Steels

the Servants of Industry

To make photographic emulsions, bar silver is dissolved in nitric acid. The equipment used must completely withstand the corrosive effect of the acid, because even a few particles of corroded metal will reduce the purity of the silver salts below manufacturing requirements. For this reason, stainless steel equipment is the logical selection.

This is one example of the service given by stainless steels. They are especially designed for many other tough jobs in industry. In the stepped-up business of war production stainless steels find particular application because of their superior resistance to corrosion and oxidation and their outstanding strength-weight ratio. When the war is over, new stainless steels and new applications will be available for even greater use of these steels by industry.

* * *

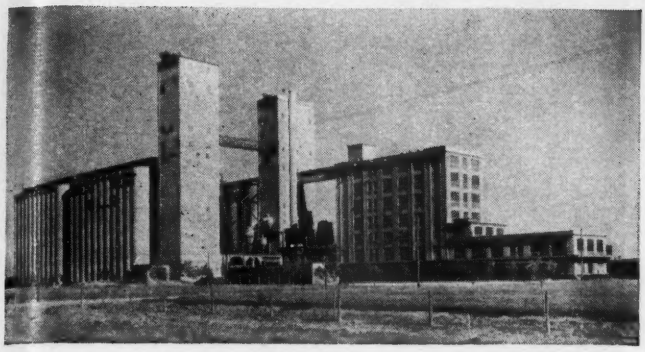
We do not make steel, but we produce the ferro-alloys that give stainless and other alloy steels their remarkable properties. Our metallurgists have made an extensive study of alloy steels, both in the laboratory and in the field. If you have a question on the selection, fabrication, or use of alloy steels, consult us.

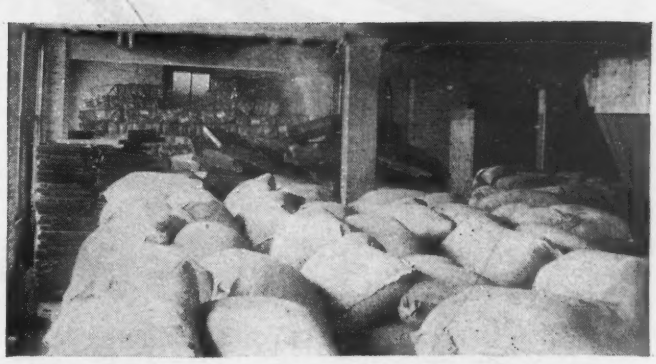
BUY UNITED STATES WAR BONDS AND STAMPS

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street New York, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

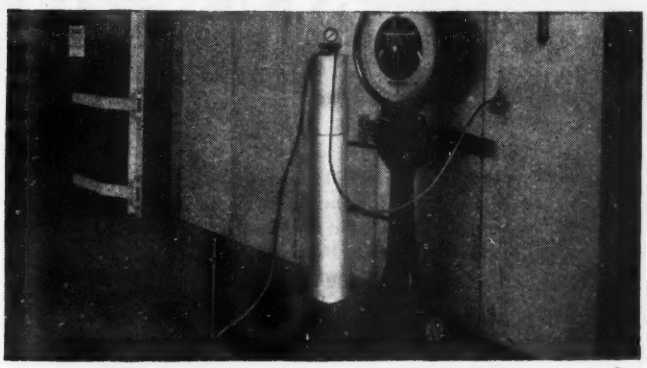
SIX ADVANTAGES of Liquid HCN Fumigation Aid Busy Mill Men





1. COMPLETE FUMIGATION under all conditions is assured by Liquid HCN—*with or without "clean-up"*—saving time and giving real economy in use. For standard dosage *with* "clean-up" only 8 oz. per 1000 cu. feet is required: *without* "clean-up" dosage may be fractionally increased to insure complete kill (100% kill has been secured with as little as 12 oz. per 1000 cu. ft.).

2. ADAPTABLE to fumigation of all types of mills and warehouses. Liquid HCN is clean, easy to use, rapid in action. A minimum amount of sealing-up or other special preparation is required for efficient fumigation when Liquid HCN is employed. This means minimum interruption of work or production schedules — an important feature for busy mills.



3. HARMLESS TO PRODUCTS AND EQUIPMENT. Liquid HCN has no adverse effects on flour or other mill products. It will not affect the product nor attack or corrode hard-to-get machinery or operating equipment.

4. SAFE AND CONVENIENT to use, Liquid HCN is applied from the outside—after building is vacated and locked. A few simple precautions make Liquid HCN entirely safe for all mill fumigation requirements.

5. ECONOMICAL PROTECTION. Cost comparisons show Liquid HCN fumigation is the most economical method of insect control available for mills, warehouses, elevators—in fact for all fumigation needs. It *kills* all stages of insect life—meaning less frequent need for fumigation to keep insect infestation under control.

6. EXPERIENCED HELP AVAILABLE. There is no shortage of skilled operators or equipment for efficient fumigation of your mills, plants or warehouses. You can turn the job over to experts by calling in an Industrial Fumigation Engineer. Let us recommend a competent organization, without obligating you in any way.

FOR MORE INFORMATION ON FUMIGATION FOR INSECT AND PEST CONTROL WRITE FOR FREE MANUAL

AMERICAN CYANAMID & CHEMICAL CORPORATION
A UNIT OF AMERICAN CYANAMID COMPANY
INSECTICIDE DEPARTMENT
30 ROCKEFELLER PLAZA, NEW YORK, N. Y. • KANSAS CITY, MO. • AZUSA, CALIF.

DON'T WAIT - FUMIGATE!

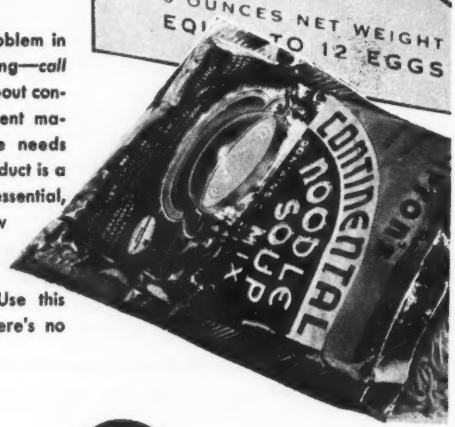
S&S MACHINES help fill war contracts

Faster!

Speeds to suit your Needs... 15–30–60–120 per minute!

S & S collaboration with leading packers has solved some of the toughest packaging problems of this war . . . has been a short-cut to speedy economical packaging in packages that really protect!

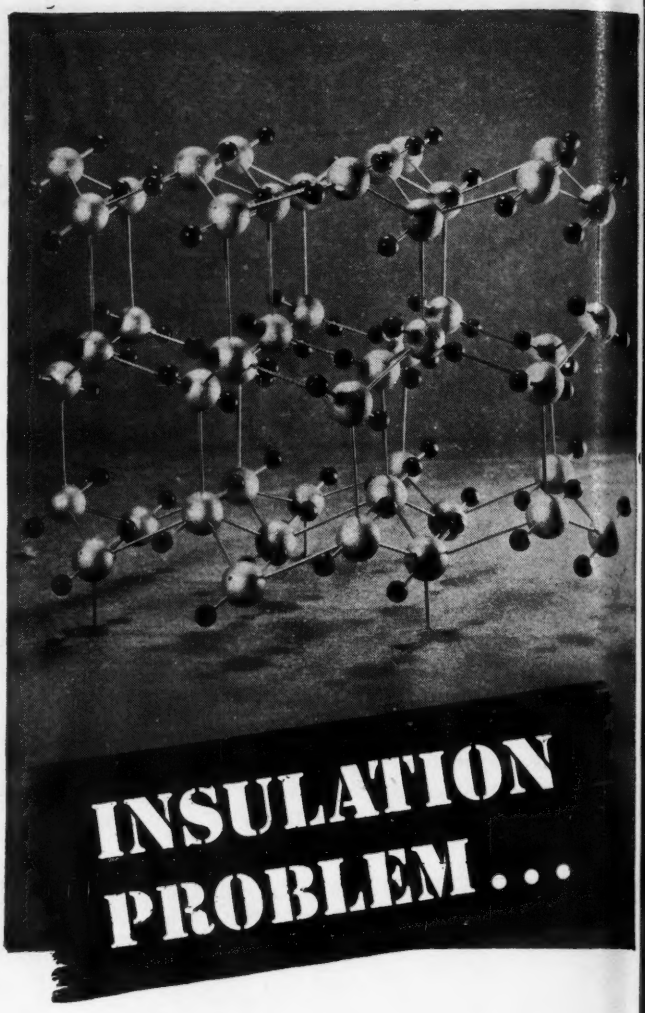
If you have a problem in wartime packaging—*call in S & S!* Ask us about converting your present machines to wartime needs . . . or, if your product is a high rated war essential, ask about the new S & S machine for its rapid, low-cost packaging. Use this service freely; there's no obligation!



STOKES & SMITH Co

FILLING–
PACKAGING–
WRAPPING
MACHINES

4911 Summerdale Avenue • Philadelphia, Penna.



THE STRUCTURE shown above represents one of the fundamental insulation problems in refrigeration. It is, in effect, the "catalyst" in which vermin and mold breed . . . it favors the activities of termites . . . and it is the basic cause of rot. It is a physicist's representation of molecules of water . . . in crystal form, as ice. The small balls represent hydrogen atoms, the large balls oxygen atoms.

Water, or moisture, causes no insulation problems, however, when J-M Rock Cork is used for low-temperature insulation. For J-M Rock Cork is sealed against moisture . . . is immune to termites, vermin, mold. It can't rot, does not absorb odors.

Rock Cork is essentially mineral wool, one of 4 basic materials from which all Johns-Manville products stem: Asbestos, asphalt, diatomaceous earth and mineral wool.

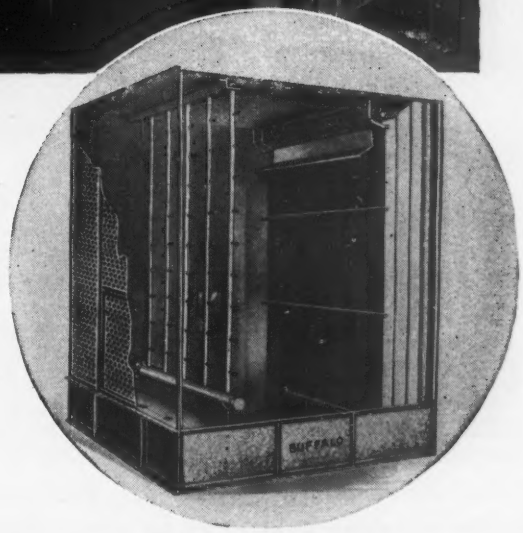
Today, the prime task of Johns-Manville is to make these products as fast and as well as possible for war needs until Victory is won. Johns-Manville, 22 East 40th Street, New York, N. Y.

JM

Johns-Manville
ROCK CORK

Sure... there's a wartime shortage of air conditioning equipment *but*

HERE'S ONE WAY TO MEET THE PROBLEM NOW!



YES, here's a practical way to bring your plant many of the benefits of air conditioning — despite the shortage of complete air conditioning equipment. Buffalo Ventilating Fans, in combination with Buffalo Air Washers, provide clean, dust-free air, properly humidified — the kind of plant atmosphere that keeps up workers' efficiency and morale every season of the year and helps safeguard quality production.

Readily installed at low initial cost, Buffalo equipment provides NOW a satisfactory answer to your air conditioning problem. Complete engineering data will be forwarded promptly on request.

BUFFALO FORGE COMPANY
152 MORTIMER ST. BUFFALO, N. Y.
Branch Engineering Offices in Principal Cities
Canadian Blower and Forge Co., Ltd., Kitchener, Ont.

"Buffalo" VENTILATING FANS AND AIR WASHERS

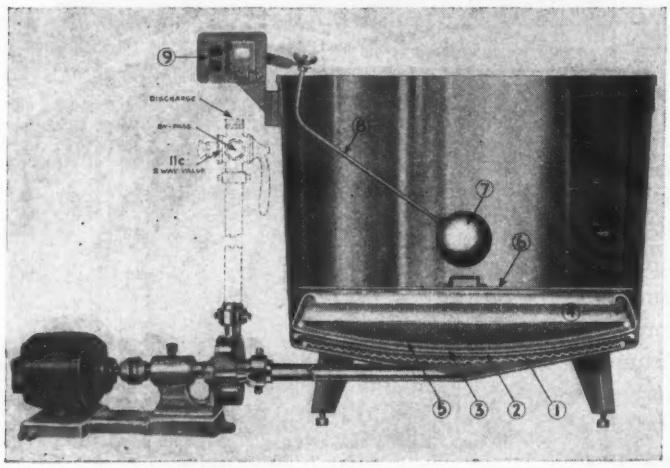
INCREASE YOUR *Filtering Capacity* ECONOMICALLY . . .

DAMROW

Gravity Type Filter

If liquid filtration is a production problem in your plant, you'll appreciate the high capacity and thorough filtering efficiency of the DAMROW—at extremely lost cost!

Working on a new GRAVITY Method, the DAMROW handles up to 25,000 lbs. per hour—without building up pressure. This means no dirt or sediment can be forced through, despite its high capacity (in actual use, up to 37,000 lbs. per hour).



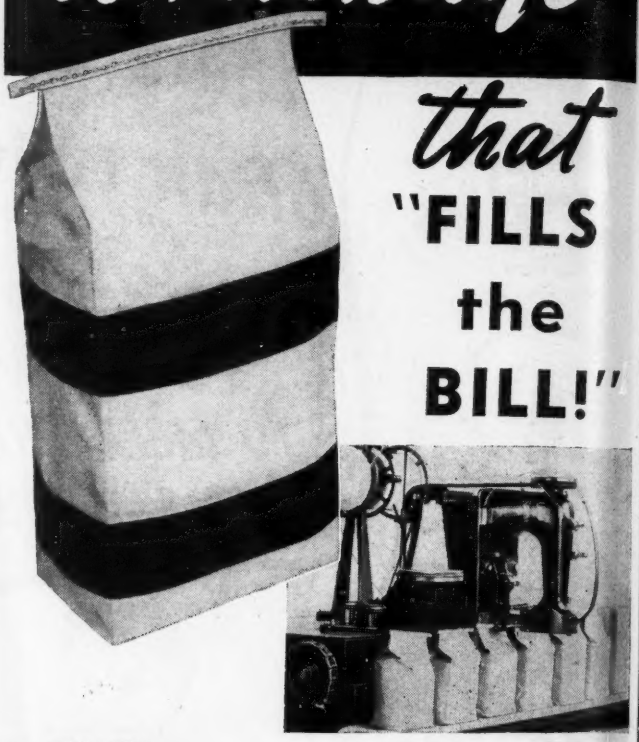
The cross-section above shows the unusual simplicity of the DAMROW Filter, its extra large filter area. Filter cloth can be changed quickly and easily, is visible for easy inspection. Available in two sizes, rated at 5,000 and 25,000 lbs. per hour, and in Dual Units providing continuous operation at high capacity. Simple, effective Automatic Float Control is standard equipment.

Write for complete details NOW on DAMROW Filtration—the economical and low cost solution to your filtration problem.

DAMROW BROTHERS CO.
190 Western Avenue
Fond du Lac, Wisconsin

Custom-Designers of TANKS CONTAINERS for ALL INDUSTRY

A Package that "FILLS the BILL!"



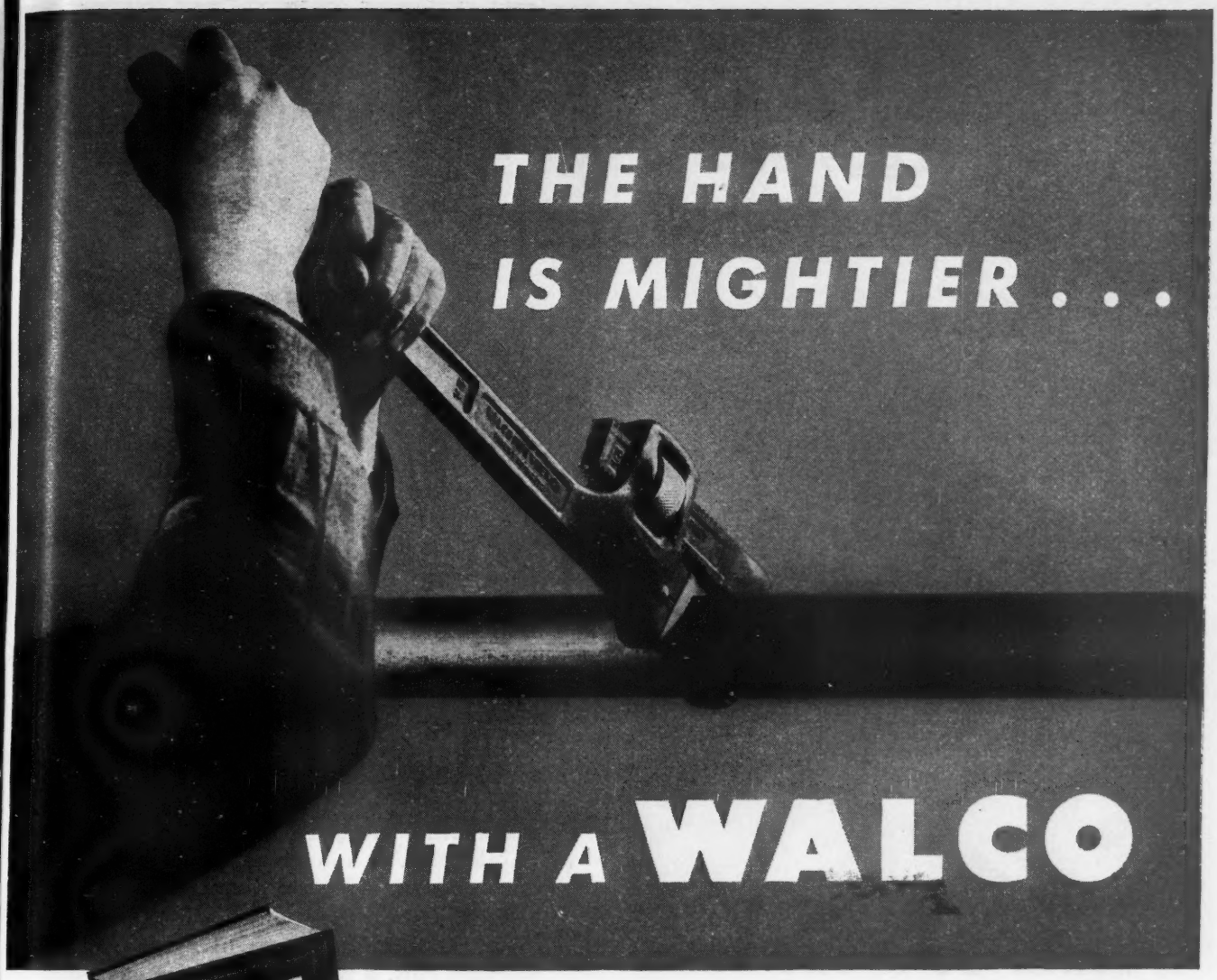
DUBL TAPE *Closure*

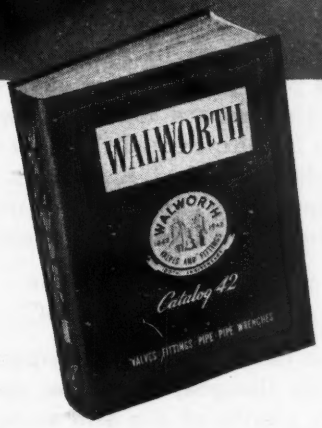
SMALL paper bags, up to 10 lb. size, closed with Union Special's new Dubl-Tape Sewed Closure make ideal containers for a wide variety of food products including sugar, flour, coffee, beans, peas, rice, dehydrated foods and dozens of similar items. The Dubl-Tape Closure produced on the Union Special *60000 C* sewing head is strong, tight, neat appearing and inexpensive to produce. Production capacity of the *60000 C* is ample to meet the output of the fastest filling equipment. Installations can be either automatic or semi-automatic as desired.

For full details on Union Special bag closers for faster, better, lower cost packaging, write today.

UNION SPECIAL MACHINE COMPANY
450 North Franklin Street, Chicago, Illinois

Union Special
Bag Closing Machines





You'll find pertinent information on Walworth's complete line of valves, fittings, pipe, and pipe wrenches in the new Walworth Catalog 42. Included are 78 pages of practical engineering data that simplify valve selection and make piping layouts easier. Write, on business stationery, for your free copy. Address: Walworth Company, 60 East 42nd Street, New York, N. Y., Department 72.

Every part of a Walco wrench is designed and built for strength and safety of operation. The Walco grips and holds no matter how hard you pull. All parts of this modern wrench are **made entirely of steel.** The handle and both jaws are made of drop forged steel. The housing and handle are forged from a single piece of steel. Both jaws are carefully machined, and all parts are heat treated to provide toughness, uniformity, and strength. The cross locked lower insert jaw, which is an exclusive Walco feature, makes it easy to remove a worn lower jaw and insert a new one. The spring may be quickly and easily replaced without the use of tools. These features prolong the life of the wrench indefinitely.

Users everywhere testify to the fact that Walco is the world's strongest wrench, the safest, and by far the least expensive to use. It is made by Walworth Company, manufacturers of valves and fittings for more than a century.

BOSTON WORKS
KEWANEE WORKS

WALWORTH
valves AND fittings

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

When You Package Edible Oils, Broken Eggs and Shortening

Frozen eggs in cans have been replaced with cellophane lined cartons — Photo courtesy, Du Pont, Wilmington, Delaware.

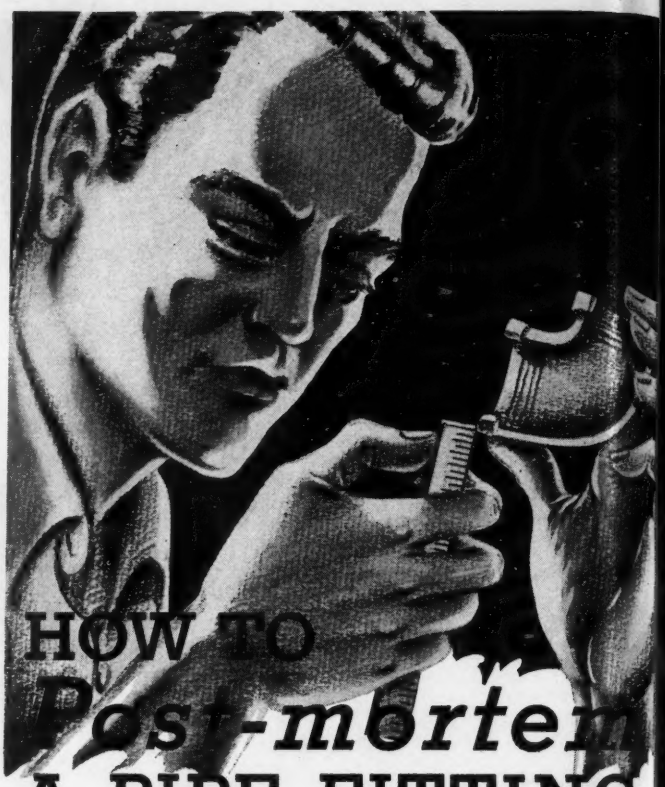
do it the Exact Weight Way.....

War economy has changed packaging materially with cartons replacing heavy metals; celloplane liners for tin; revolutionary new moistureproof wraps replacing foils but net weights for the contents are still the same. Guesswork filling is just as unsatisfactory as ever no matter what type of container. Profitable liquid-fill operations are best handled by sound pre-determined fraction-ounce weighing. Gravity feeding to floor or low bench installed EXACT WEIGHT Scales gives you a simple, efficient operation for volume packaging with profitable results.

Write for full details for your plant.

THE EXACT WEIGHT SCALE COMPANY
21 W. Fifth Ave., Columbus, Ohio
Dept. T, Toronto, Canada

Exact Weight Scales



HOW TO *Post-mortem* A PIPE FITTING

You can tell a lot about a K cast iron pipe fitting just by using one. But you can tell everything about it by cutting it open . . . examining the grain . . . measuring the thickness . . . searching for flaws . . . checking threads and chamfer.

Such a thorough-going post-mortem is given to representatives of every K production run, a post-mortem for each size and type. In this way a close check on hidden quality is maintained. In this way we help to make sure that K fittings will perform as expected . . . without nursing . . . without cracking . . . without leaking.

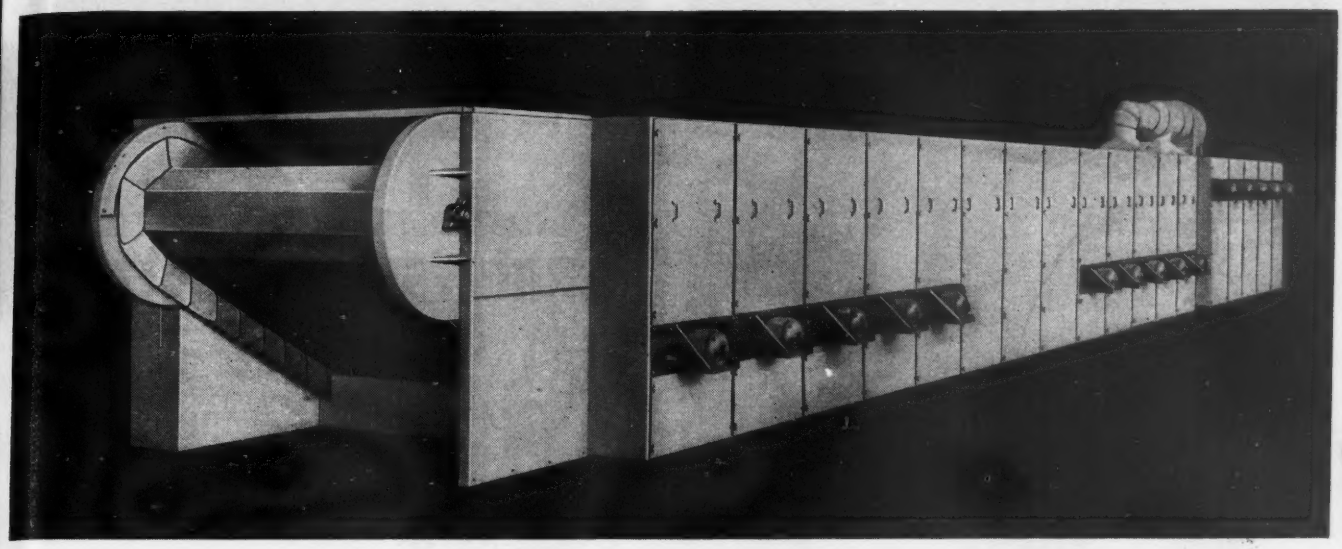
Prompt Service on Entire Line
All Cast Iron Types...up to 24"

Standard, extra heavy, flanges, companion flanges, cast lap flanges, drainage, sprinkler, etc. With plenty of pig and scrap on hand and ample production facilities, Kuhns can assure you prompt delivery, especially on the smaller sizes. Write for catalog at once.

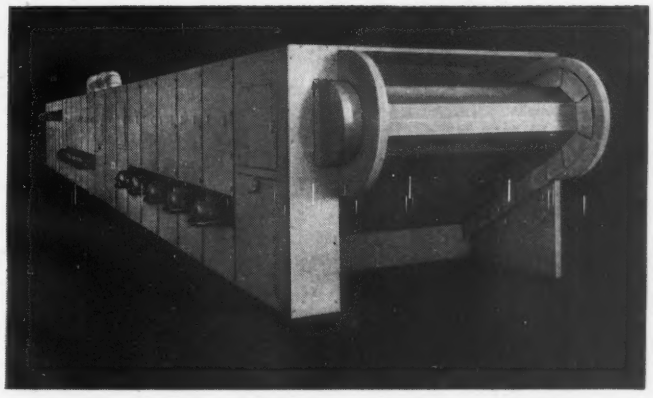
KUHNS BROS. CO., DAYTON, OHIO

STANDARD AND SPECIAL CAST IRON FITTINGS TO 24"

Combined marketing facilities on both "K" cast-iron fittings and M.I.F. malleables. Complete stocks at both Dayton, Ohio, and Branford, Conn.



FOR *Continuous,* UNIFORM VEGETABLE DEHYDRATION SPECIFY HUNTER



Pictured on this page is the new HUNTER Continuous Food Dehydrator. It comes completely equipped with all necessary controls for maintaining necessary temperatures and humidity. It is adaptable to continuously dehydrating a wide variety of food products.

The operation of this new HUNTER unit is completely automatic from the time the blanched product is delivered to the feed end of the dryer until the completely dehydrated product is delivered to the proper containers.

For full details on this unit and other modern HUNTER aids to continuous or batch dehydration write to

JAMES HUNTER MACHINE CO.
NORTH ADAMS, MASSACHUSETTS
FOUNDED 1847

DO YOUR TRUCKS TALK YOUR BUSINESS?

Today, America is Street-bound! Side-walking! Ration-shopping! Looking!—Buying!—America walks . . . but business must still ride to serve. What about your trucks? Do they carry the story of your product, your brand? Be sure they talk YOUR business! Make them representative of YOU!

Careful truck grooming and decoration is good business—and excellent advertising. Cash in on that free space on your trucks with Meyercord full-color Decals. Reproduce trademarks, products, pictorials, slogans, lettering, or patriotic morale builders. Meyercord Truck Decals are weather-tested. They assure uniformity, longer life, higher visibility and faster "over-night" application at a fraction of hand-painting cost. Competent consultation and design service—FREE.

Devote space on your trucks to Bond Sales. Write for details. Photo courtesy of Purity Bakeries.

Address Dept. 1237

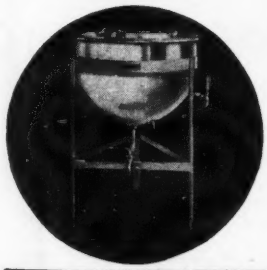
WEATHER • TIME AND TORTURE-TESTED
MEYERCORD DECALS
THE MEYERCORD CO., 5323 W. Lake St., Chicago, Ill.

LEE

PROCESSING KETTLES

Now Serving
OUR
ARMED FORCES
on Every Front

Resistance to corrosion and metallic contamination . . . stainless . . . easy to clean and keep clean . . . these durable processing kettles are serving in armed forces and essential industries everywhere. Do you have the Lee catalog in your reference files?



LEE METAL PRODUCTS CO.
INCORPORATED
416 PINE STREET
PHILIPSBURG, PA.

NEW LOW PRICE Now in Effect
LITERATURE & SAMPLE Sent on Request

ROCCAL

TRADE MARK REG. U.S. PAT. OFF.
Brand of Benzyl-Trialkonium-Chloride
GERMICIDE—SANITIZING AGENT FOR FOOD-HANDLING PLANTS

THE regular use of ROCCAL is suggested to produce *sweet, clean* and *properly sanitized* Food Handling Equipment and Storage Areas.

ROCCAL imparts no taste or odor when properly used as a sanitizing agent, and is no more corrosive to metal and rubber than ordinary water. Due to its low toxicity, ROCCAL can be used with safety.

ECONOMICAL TO USE—STABLE OVER LONG PERIODS

1 OUNCE ROCCAL GOES A LONG WAY

As a Sanitizer—1 oz. to 5 gallons of water
As a Spray —1 oz. to 1 gallon of water
For Mopping—1 oz. to 2 gallons of water

WINTHROP CHEMICAL COMPANY, INC. Industrial Division
Successor to
ALBA PHARMACEUTICAL DIVISION
170 VARICK STREET NEW YORK, N. Y.

Fifty Years of Continuous Engineering Service

CHAS. T. MAIN, INC.

ARCHITECTS — ENGINEERS

1893 CHAS·T·MAIN INC 1943

FOOD DEHYDRATION PLANTS

INDUSTRIAL ARCHITECTURE • STRUCTURAL ENGINEERING

STEAM, ELECTRICAL AND HYDRAULIC ENGINEERING

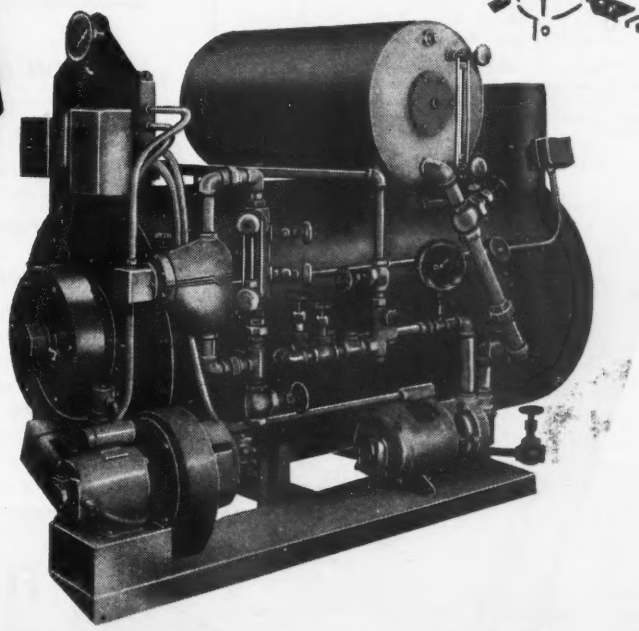
AIR CONDITIONING • REFRIGERATION

DESIGN AND CONSTRUCTION MANAGEMENT

201 Devonshire Street • Boston, Mass.

WHEN THE NAVY WANTS *"Action"*

This O&S Boiler delivers it *Fast!*



Built by O & S engineers for use at Advance Naval Bases — these fully-automatic units generate steam with the speed Navy men demand. The new boilers develop 100 lbs. pressure from 60° water in 18 minutes — or less!

Right now, these compact, efficient units are tagged "For Uncle Sam"... and some for plants with an AA-2 priority or better. But others will want to investigate now, for the day when Victory makes O & S Boilers again available for all purposes.

ORR & SEMBOWER INC. READING • PENNSYLVANIA O&S Builders of Better Boilers Since 1885

QUICK AND COMPLETE

Buying Information

I LOOK HERE FIRST . . . "The Food Industries Catalogs and Directory is in almost constant use. I look here first to save time in getting dependable information."

★

"The Food Industries Catalogs and Directory was used as a general reference book and guide. This organization is now purchasing from most of suppliers listed."

H. G. Myers, Purchasing Bureau Buyer, Quality Bakers of America, New York, N. Y.

"In view of our diversified and extensive operations we use many different kinds of equipment. As time goes on will use even more. Should like to see continued and expanded when convenient to do so."

F. W. Fetterman, Superintendent, Libby, McNeill & Libby, San Francisco, Calif.

"We often use Food Industries Catalog and Directory as a reference book when we are in doubt about a piece of machinery and we find the reference section of the book very valuable."

G. C. Freeley, Manager, Neosho Valley Cooperative Creamery Assn., Erie, Kans.

". . . and find it extremely useful. One of the valuable features to me is the complete set of definitions and standards for food products adopted under the Food, Drug and Cosmetic Act up to the time of publication of your book."

F. C. Blanck, Quality Control Dept., H. J. Heinz Co., Pittsburgh, Pa.

". . . would say that your 1942 Catalog and Directory has been in constant use by our organization."

L. E. Malcom, Canned Meat Production Dept., Kingan & Co., Indianapolis, Ind.

"We found the Food Industries Catalog & Directory valuable in our office and have passed on some of the formulas listed therein to our bakery trade. Kindly include us on your list for 1943 edition."

George Cockburn, Central Mercantile Co., St. Joseph, Mo.

Use your F. I. C. D. to find Facts on Equipment and Materials

FACTS ON EQUIPMENT, MATERIALS AND SUPPLIES:

SECTION 1
Single and Multi-page Manufacturers' Catalog Data

Turn to Section one — here are more than 100 pages of manufacturers' catalog information which picture and describe the products of leading suppliers of the Food industries. These pages give you sizes, speeds, capacities and other performance data which you can use to speed your production, cut costs.

TO FIND THE FIRMS THAT MAKE A CERTAIN PRODUCT:

SECTION 2
Classified Directory of Manufacturers

Here is the list of all manufacturers of machinery, equipment, and supplies. The names are classified alphabetically by product, with catalogers names in bold face type, giving page reference to the catalog section.

You will find more than 500 products used in the processing of foods. (In using this section always look for the principal word such as "Filter", "Mixers", etc.)

NAME AND ADDRESS OF MANUFACTURER:

SECTION 3
Alphabetical, Company Name, Address and Trade Name Index

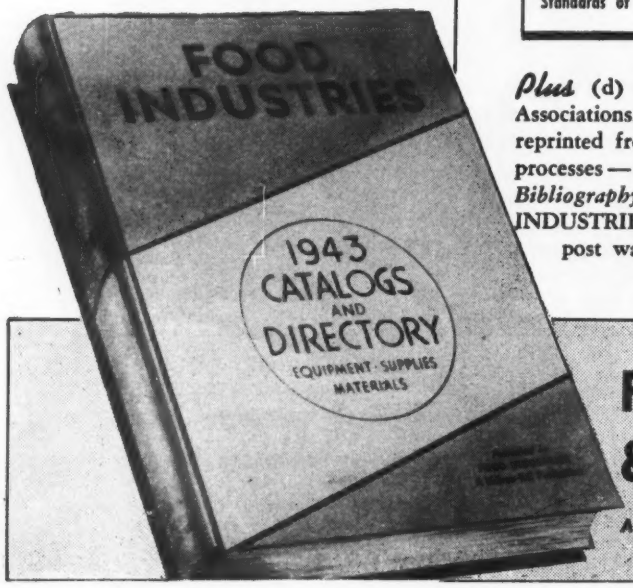
A complete alphabetical listing of the companies making the products which are listed in Section 2. This gives a cross-index and further simplifies the use of the volume.

FACTS ON LEGAL ASPECTS OF YOUR PRODUCT:

SECTION 4
Food Definitions and Standards of Identity

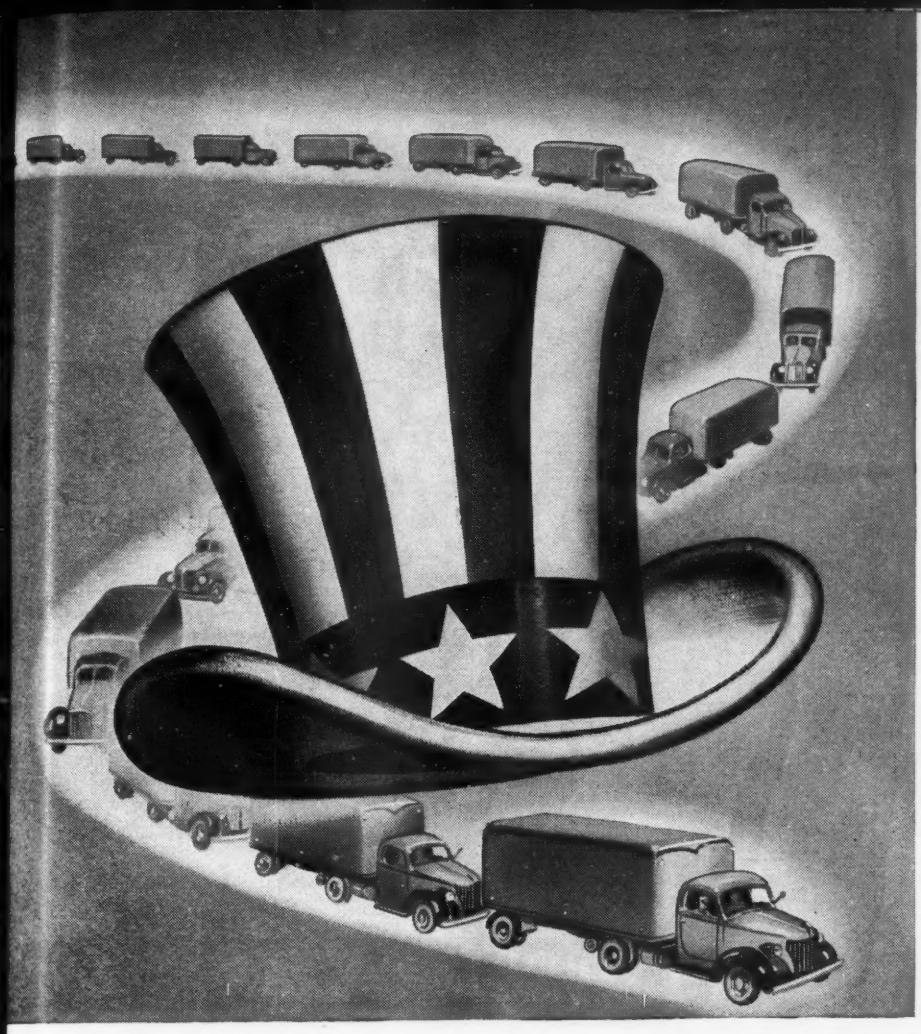
The 4th Section is valuable for reference. (a) Here are given Government definitions and standards of identity for foods. (b) List of Federal laws affecting foods, with the names of enforcement agencies. (c) Geographic list of State Food Law Enforcement Agencies.

Plus (d) *National and Regional Trade Associations* as well as State and Local Associations. (e) *Food formulas* — over 200 of them for many varieties of products, reprinted from FOOD INDUSTRIES. (f) *Flow Diagrams* of 20 important food processes — through the stages of preparation, processing and packaging. (g) *Bibliography of Articles on Dehydrated Foods* which have appeared in FOOD INDUSTRIES. This is of particular war time interest and gives a forecast of post war sales opportunities as well.



FOOD INDUSTRIES CATALOGS & DIRECTORY 330 W. 42d ST., NEW YORK, N. Y.

A UNIT OF THE McGRAW-HILL REFERENCE SERVICE



Next to Uncle Sam himself the only one who can get this "enriched" motor oil is the Fleet Operator.

What do you mean, "Enriched?"

●IN PRODUCING heat-proofed Stanolube H. D. Motor Oil, we do much the same sort of job as the manufacturers of *enriched* foods. They first process the foods, taking out any undesirable elements. Then they further add to the foods' natural goodness by enriching them with vitamins and minerals for extra nourishment, extra body-protection to the folks who eat these foods.

In producing a quality motor oil, it is necessary to take out the sludge and varnish-forming elements. In Stanolube H.D., after we have made a premium motor oil by a modern solvent-extraction process, we further *enrich* it by adding to this highly refined oil a special oxidation inhibitor and detergent developed in Standard Oil laboratories. Thus Stanolube H. D. is a premium motor oil, *plus* the extra heat resistance so valuable in heavy-duty operation. That's why this motor oil is so well adapted to protect equipment against the high temperatures resulting from the close clearances and high compression of today's gasoline and Diesel engines.

Oil is ammunition . . . Use it wisely

Although civilian use of this oil is now restricted, the need for conserving fleet equipment was recognized. Standard Oil was given the "green light" to put this maintenance-saving oil on any heavy-duty Diesel and gasoline-powered fleet equipment.

Make a side-by-side test of Stanolube H. D. with several of your hardest working trucks, against the remainder of your fleet. It represents our most advanced development in an oxidation-inhibited, detergent-type oil for protection against varnish, engine deposits, and the resultant premature overhaul and maintenance expense.

Standard Bus and Truck Oil. Designed for moderately heavy-duty service in gasoline or Diesel-powered trucks and buses where its detergency and oxidation-inhibited quality assures cleaner engine operation than can be obtained with conventional type motor oils.

A Standard Oil representative can advise you which of these war-duty oils is best fitted for your equipment.

From his experience with these products on other fleets, he can help you save both scarce parts and labor. Call any local Standard Oil (Indiana) office, or write 910 S. Michigan Ave., Chicago, Ill. In Nebraska, call any Standard Oil Company of Nebraska office.

★ *heat-proofed* **Stanolube H.D.** ★

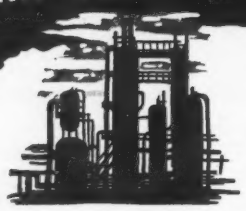
STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ **FLEET CONSERVATION SERVICE**

STAINLESS TUBING

To solve your specific

CORROSION RESISTANCE PROBLEMS



Rely on Carpenter's diversified experience in many plants where tough corrosion problems have been met and solved. For example, the types of tubing described below are a few that are commonly used to solve corrosion problems in the processing industries.

✓ **TYPE 304** Carpenter Welded Stainless Tubing resists the corrosive effects of brackish water, crude oil and gasoline.

✓ **TYPE 347,** practically immune to intergranular corrosion, is used where heat is encountered, where welding is done.

✓ **TYPE 430** provides a good combination of corrosion resistance and heat resistance.

For more help in solving your particular corrosion control problems, get in touch with our Metallurgical Department. Or, if you are anxious to make corrosion resistance a "part" of your processing equipment . . . ask for a copy of our Working Data Book. It can give you much of the information you need about sizes and shapes available, gauges, analyses and other physical properties. A note on your company letterhead will start your copy on its way.

THE CARPENTER STEEL COMPANY

Welded Alloy Tube Division . . . Kenilworth, N. J.

Carpenter

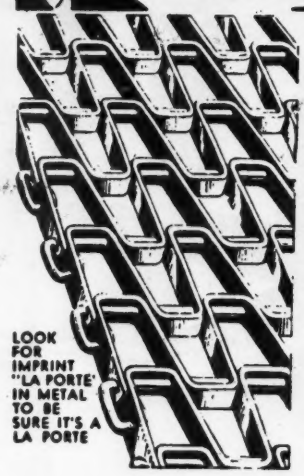
WELDED

STAINLESS TUBING

LA PORTE

FLEXIBLE STEEL CONVEYOR BELTING

FIGHTS WASTE IN EVERY PROCESS



SAVES TIME • LABOR MAINTENANCE and PROTECTS PRODUCTS

The most efficient, practical and economical conveyor belting for Pickling, Canning, Freezing and Dehydration. On grading, sorting and picking tables, also in scalders, washers, cookers, elevators, etc.

Will not creep, weave nor jump, is easily and quickly installed, and readily sterilized with a steam gun or scalding water. The open mesh feature permits the circulation of air around products in process.

Furnished in any length and practically any width. Ask your Supplier TODAY.

LA PORTE MAT & MFG. CO.

BOX 124 LA PORTE, INDIANA

IMPORTANT

WHEN YOU CHANGE YOUR ADDRESS . . .

Unlike first-class mail, periodicals are not forwarded to a new address unless the subscriber pays the additional postage.

You can avoid this annoyance—and receive your copies of FOOD INDUSTRIES promptly upon publication, by advising us of any change of address at your earliest convenience.

NAME .....

NEW HOME ADDRESS.....

CITY & STATE.....

PRESENT POSITION.....

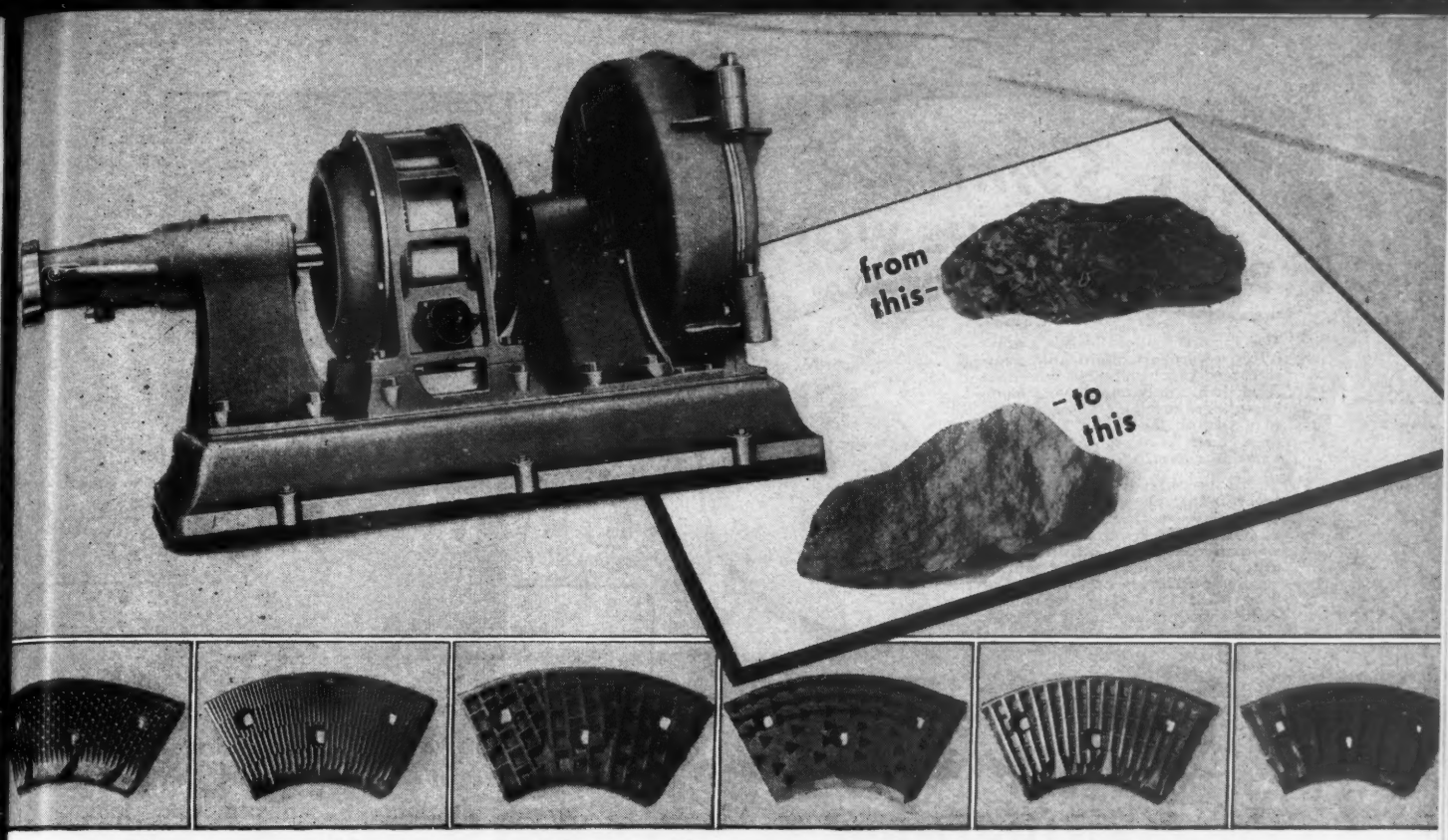
COMPANY .....

OLD ADDRESS.....

CITY & STATE.....

FOOD INDUSTRIES

330 West 42 Street New York, N. Y.



Six of the sixty or more reasons for the versatility of SPROUT, WALDRON ATTRITION MILLS. These plates show the variety of face patterns which, together with such features as adjustment of clearances while machine is running, oversize bearings, quick accessibility of working parts, low power requirements and high capacity per square foot of floor space, explain their records for production.

Interchangeable Grinding Discs and Speed Changes Let You Control Size Reductions with the Same SPROUT, WALDRON ATTRITION MILL

The SPROUT, WALDRON ATTRITION MILL is so versatile it belongs in nearly every food plant with a variety of grinding problems.

With a properly selected set of grinding plates—easily changed and easily cleaned—you can fine- or coarse-grind such diverse things as dried apples, berries, bread, leaves, milk and vegetables; or you can pulp fresh, moist or wet foods; or grind beans, biscuits, cereals, coffee, crackers, feeds, grains, nuts, seeds and spices.

Hundreds of test-run records with samples are available for inspection in the Experimental and Proving Department.

The grinding plates are made in six segments of hard white cast iron. They are rough and finish ground as a set to uniform and parallel thickness. Then they are weight-matched, with facing periferies trued, and balanced.

Result:—Unusually long life, uniform size reduction of particles, a quality output throughout.

Tell us what you have to grind or pulp and we'll send information and service data on these Attrition Mills, some of which are still producing efficiently after 40 years' continuous operation.

● *Mixers, Grinders, Sifters, Feeders, Conveyors, Packers and Special Equipment for Process Industries.*

SPROUT, WALDRON & COMPANY

Manufacturing Engineers since 1866

154 SHERMAN STREET MUNCY, PENNSYLVANIA

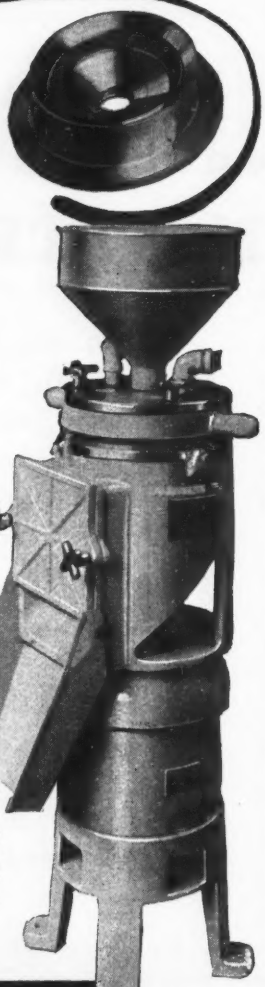
THE *Simplest* ROTOR IN THE WORLD

The Premier Colloid Mill is a gravity flow vertical colloid mill. Pressure feed can be applied when desired. It has only one moving member—the rotor. This rotor consists of a smooth face upon a frustrum of a cone. *The rotor has no teeth and no complicating mechanisms.*

It has no sharp edges which may wear in use. Because of the simplicity of mechanical operation, Premier Mills require a minimum of maintenance and attention. The rotor—the simplest in the world—assures purchasers of Premier Colloid Mills longer service without costly interruptions caused by breakdowns.

A STATOR THAT'S *Instantly and Accurately* ADJUSTABLE

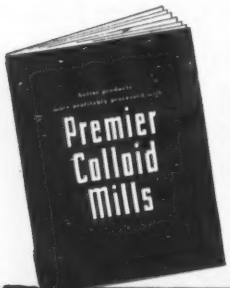
The Premier Colloid Mill can be instantly adjusted to any degree of clearance between the opposing faces of the rotor and stator. The micrometer adjusting ring makes possible adjustments from .001" upwards.



PREMIER COLLOID MILLS

For Better Products More Economically Processed

Premier Colloid Mills have won recognition from a wide range of industries as the most efficient types of machines for disintegrating, dispersing and emulsifying solids, liquids and pastes. Premier Colloid Mills are built with the *simplest rotor and stator in the world.* No matter what your product is, if uniform and even mixing of products is part of your processing problems, a Premier Colloid Mill can serve you efficiently and profitably.



FREE. A copy of our new booklet F-7 "Better Products — More Profitably Processed" will be sent upon request.

PREMIER MILL CORPORATION
218 GENESSEE STREET, GENEVA, NEW YORK
New York Sales Office: 110 E. 42 Street, New York, N. Y.

PREMIER

MAILING LISTS THAT WORK OVERTIME

McGRAW-HILL Industrial Mailing Lists are a direct route to today's purchase-controlling executives and technicians in practically every major industry.

These names are of particular value now when most manufacturers are experiencing constantly increasing difficulty in maintaining their own lists.

Probably no other organization is as well equipped as McGraw-Hill to solve the complicated problem of list maintenance during this period of unparalleled changes in industrial personnel. These lists are compiled from exclusive sources, based on hundreds of thousands of mail questionnaires and the reports of a nation-wide field staff, and are maintained on a twenty-four hour basis.

Investigate their tremendous possibilities in relation to your own product or service. Your specifications are our guide in recommending the particular McGraw-Hill lists that best cover your market. When planning your industrial advertising and sales promotional activities, ask for more facts, or, better still, write today. No obligation, of course.

McGraw-Hill Publishing Co., Inc.
Direct Mail Division
330 West 42nd Street New York, N. Y.

TIN HAS GONE TO WAR!

"FLAV-O-TAINER" bags are made with heavy paper outside, and completely heat sealed Cellophane lining - an economical package for rations, chemicals, medical supplies, metal parts and other products requiring great protection against gain or loss of moisture.

U. S. PATENTS NOS. 2,234,051; 2,234,065; 2,256,506

MADE ONLY BY

THOMAS M ROYAL & CO

PHILADELPHIA U S A

We also manufacture a complete line of air-tight, moisture-proof bags - all sizes, styles and shapes - from Reynolds war-packaging material, glassine, cellophane, kraft and laminated specialties - with or without heat-sealing features.

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

10 cents a word, minimum charge $2.00. (See ¶ on Box Numbers.)

POSITIONS WANTED (full or part-time individual salaried employment only), ½ above rates.

PROPOSALS, 50 cents a line an insertion.

INFORMATION:

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

The advertising rate is $6.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches —to a page. F.I.

NEW ADVERTISEMENTS received by 10 A. M. July 19th will appear in the August issue, subject to limitations of space available

MANAGER WANTED
for Apple Juice and Cider Plant.

Experienced in production and plant supervision, also interested in making minor capital investment.

RATHKE AND COMPANY
Colman Building Seattle, Washington
Delivery Section 4

POSITIONS VACANT

WANTED: Production Executive by substantial prominent Eastern food manufacturer having above average industry position, and now war-classed "essential." Position offers exceptional present and post-war potential advancement possibilities. Vegetable canning experience helpful but not necessary. Application must include complete record, entire past experience and sufficient personal detail for us to determine whether worthwhile interviewing. Replies held strictly confidential. Our organization knows of this advertisement. P-147, Food Industries, 330 W. 42nd St., New York, N. Y.

WANTED: EXPERIENCED MAN in essential vegetable cannery located in Wisconsin. Permanent job, plenty of opportunities for advancement and expression of personal ideas. Knowledge of Chemistry, bacteriology and canning procedure essential. Man to have charge of Research Laboratory. Write giving experience, age, salary expected and draft status. All information confidential. P-162, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

EXCELLENT PERMANENT OPPORTUNITY for man with canning house experience with knowledge of packing apples, cherries, peaches, peas and few vegetables. Mechanically inclined. Year round position. Salary and bonus arrangement. State age, draft status, experience in detail. P-163, Food Industries, 330 W. 42nd St., New York, N. Y.

EXPERIENCE EXECUTIVE to manage and operate a Large Company engaged in the Sauerkraut and Pickle business. This Company operates plants in the South, North, and Midwest. It grows its pickles and vegetables under contract, also cures, processes, and packs its product. Anyone interested is requested to enclose in a letter his name, age, experience, and other qualifications, and mail to P. O. Box 93, Lansdowne, Pa.

MAN with knowledge of food industries and processing, including problems of the meat packing, canning and dairy industries. Must combine sales and technical experience in extending service to national food accounts, also to work with present well-established sales and service organization on cleaning and maintenance operations in the Food Industry. Must be willing to travel. Give brief history regarding experience, age, salary, marital and draft status. Replies held confidential. P-166, Food Industries, 330 W. 42nd St., New York, N. Y.

POSITION WANTED

PROGRESSIVE PRODUCTION CHEMIST available. University graduate, Protestant, married, age 48. Long manufacturing experience food products, specialties, supplies, bakers, confectioner, candy maker, hotels, institutions, other trades. Improve, substitute or create new merchandise, purchase raw material. Prefer New York or vicinity. Write PW-161, Food Industries, 330 W. 42nd St., New York, N. Y.

WANTED

WANTED, One Good, used, serviceable Pulper. Michigan Canneries, Dundee, Michigan.

TIME is the No. 1 PRODUCTION TOOL
Gain It . . . Save It . . . Use It . . .
"CONSOLIDATED"

★ 1—Pneumatic Scale Packaging Unit. ★
★ 1—Pneumatic Scale Automatic Wax Liner. ★
★ 1—J. H. Day #2 Brighton Mixer, 80 gal. cap. ★
★ 6—8 to 40 gal. Pony Mixers. ★
★ 15—Dry Powder Mixers, from 50 to 4000 lbs. ★
★ 1—American Auto. Weigher and Filler. ★
★ 2—80-qt. Century 4-speed Mixers, m.d. ★
★ 1—28"x60" double drum B & C Atmospheric Dryer. ★
★ 1—Buffalo 24" Vanilla Bean Chopper. ★
★ 4—World, 1-Ermold semi-auto. Labeling Machines. ★
★ 2—Karl Kiefer Visco Filling Machines. ★
★ 1—Johnson mod. JA Cellophane Wrapper. ★
★ 11—Filter Presses P & F; Recessed; to 42" Square. ★
★ 1—World Rotary Automatic Labeling Machine. ★
★ 1—Stokes 500 gal. Copper Jacketed agitated vacuum Pan. ★
★ 2—Mechanical 4x9' Lard Rolls, m.d. ★
★ 17—Stainless Steel, Copper; Glass Lined; Kettles and Vacuum Pans, up to 550 gal. cap. ★
★ 2—Schultz-O'Neil Pulverizers. ★
★ 3—K.K. & U.S. Rotary bottle Rinsers, m.d. ★
★ 1—5x35' Louisville Steam Tube Dryer. ★
★ 1—Elgin 12-spout Rotary Piston Filler, S.S. ★
★ 12—Copper Tanks to 7000 gal. ★
★ 1—Johnson T & B Sealer Unit. ★
★ 2—O. & J. 7-place Rotary Labelers, m.d. ★
★ 4—2"x2" Bronze Rotary Pumps, m.d. ★

● *Send for "Consolidated News" listing complete stock.*

We buy and sell from a Single Item to a Complete Plant

CONSOLIDATED PRODUCTS CO., Inc.

Office: 13-17 PARK ROW, N. Y. Shops: 335 DOREMUS AVE., NEWARK

Buy With Confidence — "Consolidated"

Plan to get business in the Southeast, the most rapidly growing section in the country— now and after the war.

MANUFACTURERS REPRESENTATIVES in Georgia, Florida, Alabama, North Carolina, South Carolina and East Tennessee, including Nashville, desire accounts offering major raw material items to bakers and other food manufacturers, particularly Soybean Flour, Dried Milk, Fruit Products, Etc. Ten years varied experience, financially responsible, excellent references available. Can finance selling on strictly commission basis. Write

RA-165, Food Industries
330 W. 42nd St., New York, N. Y.

Food manufacturer has Stokes & Smith automatic packaging line now working only part time. This line will package any free flowing material in a paper carton measuring 3½ inches by 2¾ inches by 1¼ inches. Can arrange to receive material in bulk packages and deliver in shipping cases ready to ship. If interested describe product and quantity to be packed.

CW-154, Food Industries
330 West 42nd St., New York City

WANTED

WANTED: PRESSURE COOKERS about 4 ft. in diameter by 3 ft. high, and good for 25-lb. steam pressure. W-155, Food Industries, 330 W. 42nd St., New York, N. Y.

SILENT BUFFALO CHOPPER Wanted—300 lbs., or more. Appetizing Food Products, 3287 Meldrum, Detroit, 7 Mich.

M.V.P. Glassine Available
Small quantities monthly.
Excellent test.
Write for samples.
THE COMMONWEALTH PRESS
Worcester, Mass.

F.M.C. EQUIPMENT *"Ready to Operate"* *for* FOOD PRODUCTION!

✓ ✓ OUR INDEX FOR YOUR REQUIREMENTS

1 Atlantic Utility Cake Breaker; 3 tons per hour.

2 Louisville Tubular Dryers; 6′ x 35′.

1 National Equipment, 10 plunger, Filling Machine.

2 Pneumatic Scale, 6 spout, Samco Jr. Fillers.

F M C *Processing Equipment*

2 Nickel Lined, Insulated Rectangular Tanks, approx. 500 gal. capacity.
1 Devine Rotary Vacuum Dryer, 3′ x 25′.
1 Vacuum Pan, 3′ dia., coiled & jktd., with condensing pump.
2 Smith No. 1 Choppers.
40 Copper Jktd. Kettles; 10 to 850 gal. capacity.
20 Monel Jktd. Lab. Kettles; 1-5 gal.
1 Kane 10 H.P., gas heated Boiler.
1 Devine #23 Vacuum Chamber Dryer, for 13 shelves, 59″ x 78″.
1 Devine #4 Vacuum Chamber Dryer, for 8 shelves, 42″ x 43″.
1 Devine Laboratory Drum Dryer, 2′ x 2′.
25 Gruendler, Mead, Raymond, Williams Hammer & other Types of Mills.
1 Wolf 3 stand high Roller Mill; rolls 9″ x 30″.
2 Schutz O'Neill Roller Mills one stand, 9″ x 24″.
6 Alberger, Westinghouse and other Condensers; from 35 to 1000 sq. ft.
2 Refrigeration Units; 10 and 20 ton.
6 Double Arm Mixers; jktd. and unjktd., 30 to 250 gal.
15 Kiefer and other make Filters; pressure and gravity.
8 Copper Vertical Percolators, 4′ x 10′ 6″.
6 Pulp Washers.
1 Peerless 82″ Exhauster.
2 Copper Jktd. Pans, 50 gal.
1 Copper Vacuum Pan, 4′ 6″ dia., coils—no jackets.
2 Change Can Mixers, 15 gal.
6 Horizontal Dry Mixers, 200 to 2000 lbs. Capacity.
Agitators Portable ¼ H.P. and up.

F M C *Packaging Equipment*

8 Ilgair Unit Heaters; capacity 3000 and 5000 C.F.M.
2 Pneumatic scales bulk weight Fillers; straight line and rotary.
Conveyors—Belt, Roller and Screw.
1 Pneumatic Scale; 16 stem Stainless Steel automatic Filler.
1 Ayers 10 Pocket Pea & Bean Filler with Syruper.
1 Anderson Barnsgrover 12 Valve Syruper and Filler.
2 U. S. 60 spout Rinsers.
1 Kiefer 72 spout Rinser.
1 Johnson Wax Wrapper for bread.
1 Package Machinery Co. cube wrapper.
1 Hanson pocket pea Filler.
2 M & S 6 spout Fillers.
1 Philadelphia, 4 piston, Jktd. Filler.
1 National Packaging Machine; 2 station automatic Filler.
1 Gump style A1 net weigher; capacity 2 oz. to 2½ lbs.
8 Fowler, Haller, Kiefer and other makes gravity Fillers.
2 Three Ton Chain Hoists.
6 Ermold, O & J, World, and other semi & automatic Labelers.
6 Can Labelers, Burt and Standard Knapp.
2 Standard Automatic Vacuum Fillers; 12 and 15 spout.

F M C FIRST MACHINERY CORP.
EAST 9th STREET & EAST RIVER DRIVE, NEW YORK.

Let us know what you need—
Try us on the unavailable

PROMPT QUOTATIONS

•

Latest Facts from FIRST FACTS
send for your copy!

FOR SALE

4—Pneumatic Scale Duplex Automatic Straight Line Labelers
5—Copper Spray Towers, 8'6" dia. x 32' high
1—Creamery Package Mfg. Stainless Steel Jacketed 100 gal. Pasteurizer, 34" dia. x 32" deep, with agitator.
1—48"—1", 25-tube Copper tubular cooler
1—Creamery Package Mfg. Stainless Steel 100 gal. Pasteurizer, Rectangular, 46 x 20 x 32, with agitator
1—Motor Driven Cream Separator with A-C motor
1—Burt Multiple Series-A Can Labeler
7—Filter Presses, Sperry, Shriver, Crossley, Johnson
35—Wood Storage and Fermenting Tanks 130-7,000 gals.
18—Glass lined sectional tanks 750-19,000 gals.
1—Richardson Automatic Grain Scale
9—Copper and cast iron rectifying columns 7" to 72" dia.
30—Steel Horizontal Storage Tanks, 4,650-9,300 gals. with legs and manholes
5—Kiefer and U. S. Rotary Rinsers
9—Day Horizontal Powder Mixers
1000' Double Pipe Coolers, all sizes

Write for latest stock list.

Perry Equipment & Supply Co.
1515 W. Thompson Street, Phila., Pa.

★ SELECTED BUYS *from the West Coast*

Cooker Cooler Exhaust Box, for #10 cans, large capacity.
A-B Cooker 1360 cans 1-T & #2.
Eccentric Lock Retort, 4' x 18'.
Batch Peelers, 45, 60, 75 Lbs.
Kettles, Tilt type 10-30 Gals.
Labelers, Knapp-Burt all sizes.
Caser, Knapp #B, motor driven.
Tomato rotary preparation table.
Ayars 9 pocket filler for #2½.
Dow Bronze steam pump 4x5x10.

★ ★

Specialists in all types of food machinery
Let us know Your specific needs

★ ★

We Buy and Sell . . . .
Single Items to Complete Plant

MACHINERY AND EQUIPMENT CO.
728 Bryant St., San Francisco, Calif.

12" Conveyor, 80' long, Angle Iron frame, Continuous Chain Drive, Wooden Cross Slats, arranged for Motor Drive.

Lewfrank Industrial Corp.
P. O. Box 565, Rochester, N. Y.

FOR SALE

Empty dried fruit boxes, once used, 25 and 50 lb. size, price 8¢ apiece, F.O.B. New York City.

FS-157, Food Industries
330 West 42nd St., New York City

FOR SALE

Empty olive barrels and hogsheads

FS-160, Food Industries
330 W. 42nd St., New York City

GUARANTEED! *Rebuilt Equipment*

We are now in our fine new building and gradually getting settled. Meanwhile, we still have a large inventory of guaranteed rebuilt machinery . . . ready for immediate shipment and use. We haven't room for it all, so here is our

"Get Acquainted" SALE!

in order to move this equipment and put it to work for Uncle Sam and you. Everything at a sacrifice—write for information.

READY TO SHIP NOW!

1—Premier Colloid Mill, 22" rotor, 50 HP 60 cy. 3 ph. 1750 R.P.M. motor.
1—24" Sperry Plate & Frame Filter Press, aluminum, 15—1" frames, closed delivery, 105 Sq. Ft.
1—42" Sperry Plate & Frame Filter Press, C.I., 20—1" plates; 20—3" frames, open delivery 56 cu. ft. (also 40—1" frames & 40—1" plates extra.
2—24" Crossley Recessed Plate Filter Press, C.I., 60—1" plates, open delivery, 450 Sq. Ft.
1—#10 Sweetland, Everdur fitted 36 leaves on 3" centers top discharge with Everdur frames, Maple wood filled. (Also extra set of 36 Bottom discharge leaves.)
1—Mixing Tank, 8'x8' Vertical S/J, top gear drive; 10 HP motor.
1—Mixing Tank, 8'x16' Horizontal S/J spur gear drive, 20 HP motor, Falk reducer.
1—Mixing Tank, 9'x7' Vertical, 7½ HP motor, Falk top drive.
1—200 GPH Atlas Copper & Brass (water) Polarstil, tinned copper throughout.
1—Davenport 3A Grain Press Adt. Hydraulic type Grain Press.
2—3000 gal. bolted heating tanks, copper coils.
1—7000 gal. riveted heating tank, copper coil.
1—Raymond Flash Drying System—like new, 6000 per hr. cap.—(complete, ready to ship) 60"x39', direct heat rotary drier.

Tanks

6—9000 gal. bolted sectional.
1— 35 gal. S/J aluminum kettle, motor driven agitator.
1— 80 gal. S/J copper kettle.
2—1900 gal. Pfaudler glass lined.
1— 800 gal. horizontal glass lined.
1—1000 gal horizontal glass lined.
1—1250 gal. horizontal glass lined.

Charles S. JACOBOWITZ *Company*

3080 MAIN STREET BUFFALO 14 N. Y. PHONE AMherst 2100

Serving American Industry for over 25 Years

FOR SALE
Old style Creamery Package
HOMOGENIZER

3 phase—220 volt—500 H.P. Motor, working condition.

TERWILLEGER & WAKEFIELD, INC.
1208 E. Ridgewood Ave., Ridgewood, N. J.

FOR SALE

APPLE PARING MACHINES

Six, triple unit, Boutell Apple Paring Machines in 1st class mechanical condition.
Also quantity replacement parts for same.

BATTLETOWN FRUIT COMPANY
Staunton, Virginia

FOR SALE

4 Barrel Super New Era Dough Mixer No. 4, excellent for mixing of dry ingredients, manufactured by American Machine and Foundry Co., Brooklyn, New York. Stainless steel jacket—Practically new bowl—Entire machine in partially reconditioned stage—Daily use until recently— 25 H.P. D.C. Motor available. Machine and motor all on display on premises.

ROCKWELL'S BAKERY, INC.
328-336 East 75th St. New York City, New York
Attention—General Manager

IF THERE IS
Anything you want
that other readers of this paper can supply

OR—

Something you don't want
that other readers can use, advertise it in the

SEARCHLIGHT SECTION

WANTED

WANTED

2—Tablet Machines; 3—Filters.
2—Dry Powder Mixers, with or without Sifters.
2—Rotex Screens; 1—Packaging Machine; 1—Glass Lined Kettle; Stainless Steel, Monel, Copper or Aluminum Jacketed Kettle and Vacuum Pan.

W-132, Food Industries, 330 W. 42nd St., N. Y. C.

CONVEYORS WANTED

Up to 5000' roller gravity conveyor for cash. Send detailed description and price to the

Island Equipment & Supply Co., Inc.
101 Park Avenue, New York, N. Y.

Equipment Wanted

Interested in purchasing Food Mfg. Machinery Plant, patents or ideas of merit on food processing equipment.

W-164, Food Industries
520 No. Michigan Ave., Chicago, Ill.

WANTED

Platform hand operated lift trucks, about 3000 pounds capacity. State age and price.

W-158, Food Industries
330 West 42nd St., New York City

SPRAY DRYER WANTED

Purchase, lease, or contract work. State details.

W-156, Food Industries
330 W. 42nd St., New York, N. Y.

GUARANTEED EQUIPMENT!

- AGITATORS
- CENTRIFUGES
- DRYERS
- FILTER PRESSES
- GRINDERS & PULVERIZERS
- HOMOGENIZERS & COLLOID MILLS
- KETTLES, JACKETED
- FILLERS & LABELLERS
- RETORTS & STERILIZERS
- GLASS LINED, STAINLESS STEEL & MONEL STORAGE TANKS

We buy single items to complete plants for cash!

Machinery & Equipment Corporation (of N. Y.)

59 E. 4th St. New York 3, N. Y.

FOR SALE

2—4x6' **Buffalo Atmospheric Drum Dryers.**
2—**Triple effect Evaporators.**
1—**Berlin-Chapman** 15-pkt. **Syruper-Filler.**
1—2-roll **Raymond Roller Mill.**
2—**Karl Kiefer Visco Fillers.**
1—**Urie Universal Filler.**
6—±600 **DeLaval Clarifiers.**
1—**World automatic rotary Labeler.**
2—**Rotary Bottle Rinsing Machines.**
2—**M&S Universal Filling Machines.**
1—±6 style B **Peerless rotary Exhauster.**
1—48x54" **Fort Wayne Sterilizer.**

Dough and Powder Mixers, Bottle and Can Fillers, Filters, Filter Presses, Mills, Dryers, Pumps, Boilers.

Send us your inquiries, also your list of surplus equipment, which we purchase for cash.

LOEB EQUIPMENT SUPPLY CO.
903 N. Marshfield Ave. Chicago, Ill.

Davidson Wet Vacuum Pump 3½ x 4 x 4. Several used Copper Steam Jacketed Kettles.
3 HP Elec. Motor D.C. 575 rpm perfect.
One 10 HP Kane gas fired steam boiler almost new.

THOMAS BURKHARD, Inc.
494-496 Flushing Ave., Brooklyn, N. Y.

FOR SALE

50 gal. Alum. Direct Fired **Kettle,** agit.
300 gal. **Nickel Tanks,** 36"x60"x36", insul.
60 gal. **Pfaudler Tank,** jkt., rev. coil.
2—100 gal. **Glascote Tanks,** jkt., agit.
200 gal. **Pfaudler Tank,** jkt., agit., 38x42.
300 gal. **Pfaudler Tanks,** horiz., 42x48, insul.
70 gal. **Copper Still** with coil, 26"x36".
25 gal. **Copper Kettle,** jkt., agit., 22x18.
250 gal. **Steel Kettle,** jkt., agit., 36x60.
100 lb. **Day Mixer & Sifter,** m.d.
J. H. Day Post Mixers, S.S. paddles.
1½ bbl. **Dough Mixer,** 3 H.P.
80 qt. **Hobart Mixer,** 2 H.P.
2" **Buffalo Centrif. Pump,** 7½ H.P.
60 to 400 gal. **Homogenizers or Viscolizers.**

Send Us Your Inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York, N. Y.
MUrray Hill 2-4616

FOR SALE

2 Jumbos, Model E, in excellent condition. Also 4 Ermold Labelers, 2-1937 8-wide, 2 late model 6-wide. Must sell immediately.

FS-159, Food Industries
330 West 42nd St., New York City

SPECIAL Just Received

2—Pneumatic Scale 20 spout vacuum type filling machines.

1—World fully Automatic Rotary Labeling Machine, directly Motor driven.

IN STOCK . . . READY FOR IMMEDIATE DELIVERY!
ALL OFFERINGS SUBJECT PRIOR SALE! Wire Collect For Prices & Details!

2—12" **Micro Pulverizers,** motor driven.
Pneumatic Scale Co. Top Sealer and Wax Liner.
48" **Copper Vacuum Pan,** jacketed, complete with condenser, vacuum pump, etc., also 20 to 300 gal. sizes.
World Semi-Automatic Bottle and Jar Labeler.
Ermold Bottle Labeling Machines, motor driven.
Werner & Pfleiderer, 2,500 gal., double arm jacketed **Storage and Mixing Tanks.**
U. S. Bottlers 10 spout Model C-10 **Filling Machine,** 4 to 16 oz. cap.
850 gal. capacity Steam Jacketed **Single Action Vertical Mixing Tank.**
Gruendler #2 Peerless Hammer Mill equipped with roller bearings for motor drive.
Johnson, Automatic Packaging Unit, for setting up, filling and closing cartons.
PACKAGING AND CARTONING EQUIPMENT
Including cartoning units, filling and wrapping machines—all types, makes and sizes in stock

We Pay Cash For Single Machines Or Entire Plants

EVERY MACHINE REBUILT TO UNION'S STANDARD OF PERFECTION

UNION STANDARD EQUIPMENT CO.

318-22 LAFAYETTE STREET
NEW YORK, N. Y.

FOR SALE

Triangle Model "U" Bag Filler
Hayssen Cellophane Box Wrapper.
Schutz O'Neill Dustless Sugar Pulverizer No. 3, No. 0 and 16" Limited.
24" Pebble Mill, belt drive.
1 ton York, 1 ton Lipman 3 ton Frick, 5 ton Jurick and 7½ ton Lipman Self-contained Refrigeration Units.
Steam Jacketed Copper Kettles, 15 gallon to 350 gallon capacity.
Dean Glucose Pump Steam Driven.
Tabor 3" Glucose Pump, motor driven.
Read 80 qt., Hobart 80 qt., Century 30 qt., and Read 12 qt. Vertical Mixers.

SAVAGE BROS. CO.
2638-46 Gladys Avenue Chicago

Pebble Mills—new 4 jar mill
18" x 24". 36" x 36" relined with new porcelain lining
Blowers and exhausters—motor and belt driven
Ejectors with and without inter condensers
10" x 30"—3 roll water cooled **Kent mill**
Air compressors
Heating coils—2 Banks

LAWLER COMPANY
Durham Avenue & L. V. R. R., Metuchen, N. J.

FOR SALE

DRYERS

1—Buflovak 5' x 6' Atmospheric Drum
1—Vulcan 6' x 42' Rotary
1—Rotary Vacuum, 2½' x 10'
2—Scott 3' x 8' Rotary Vacuum
1—Atmospheric Double Drum, 4' x 9'
7—Rotary 3' x 30', 4' x 30', 5' x 35', 6' x 65'
2—Hersey Rotary Indirect 5' x 25', 6' x 25'
2—Carrier 12 truck Atmospheric
1—Industrial Heater, single drum Atmospheric

KETTLES—PANS—EVAPORATORS

3—Swenson Triple Effect Evaporators
1—Buflovak No. 55 Triple Effect Evaporator
1—Buflovak Impregnating Kettle, 42" x 60"
1—Devine 60" x 48" Cast Iron Kettle
3—Copper Vacuum Pans, 2'6", 6', 7' dias.
1—Badger 1000 gal. Copper Still
1—Copper Still, 6' dia. x 8' high, with condenser
25—Copper Jcktd. Kettles, 50 to 2000 gals.
9—Steel Jcktd. Kettles, 50 to 2000 gals., agitated
1—Pfaudler 42" dia. x 108" high glass lined, jcktd., Vacuum Pan with copper coils

CENTRIFUGALS

1—American Tool 40" Rubber Lined
1—Tolhurst 40" Suspended, with 10 HP AC motor
3—Tolhurst 40" Suspended, with 15 HP motors
3—Tolhurst 40", 48", 60", center slung
7—Tolhurst 32", 40", 48", 60" self-balancing
6—Sharples No. 6
1—Sharples Lab. Centrifuge
4—De Laval Nos. 200, 500, 600, 700

MIXERS

2—W. & P. 9 and 50 gal., Jcktd. and plain
1—Day No. 30 Imperial Jcktd., 75 gal.
5—Change Can, 8 to 40 gal.
1—Day Universal, Jcktd., 265 gals.
2—Day, Robinson 500 and 600 lb., Jcktd.
20—Day Powder Mixers, 25 to 2000 lbs.
5—Hobart and Century Vertical Cream Mixers
6—Ross, Day, Read, Lab. to 350 gal.

FILTERS

1—Oliver 36" x 36", cast iron, 41 chambers
1—No. 5 Sweetland, 30 copper leaves, 2" centers
1—No. 7 Sweetland, 21 leaves, 3½" centers
3—12" Ertel Disc Filters
1—Sperry 36" x 36", cast iron, 41 chambers
10—Shriver Skeletons, 12" to 36" square
8—Kilby 30" x 30", cast iron, 38 chambers
5—Oliver Torary, 4' x 6' to 12' x 20'

PULVERIZERS—GRINDERS

2—Raymond Roller Mills, 3 and 5 roll
5—Raymond No. 0000, 00, 0, 1, 3
7—Hammer Mills, Williams, JayBee, Jeffrey, 5 to 100 HP
5—Mead Mills, Nos. 1, 2, 3
1—Schutz O'Neill No. 3 Sugar Mill
15—Pebble Mills, Lab., to 300 gal.
6—Roller Mills, Lab., to 16" x 40"
6—U. S., Premier Colloid Mills, ½ to 100 HP
1—10" Premier with 20 HP AC motor
3—Schutz O'Neill Mills, 20" to 28"

TANKS

5—Sectional Brewery, 8' to 10' dia.
10—Glass Lined, 50 to 1500 gals.
15—Steel Storage, 3500 to 15,000 gal.
2—20' x 10' Open Top Steel

FILLING & PACKAGING EQUIPMENT

3—Stokes, Stokes & Smith Powder Fillers
2—Kiefer Visco Fillers
4—Knapp, Burt Can Labelers
10—Ermold, World, Semi-Automatic Labelers
2—World, International Automatic Labelers
1—Kiefer 8 spout Vacuum Bottle Filler
1—Kiefer 18 spout Rotary Bottle Filler
5—Stokes, Colton Jar Fillers
1—Pneumatic Scale Packaging Unit

MISCELLANEOUS

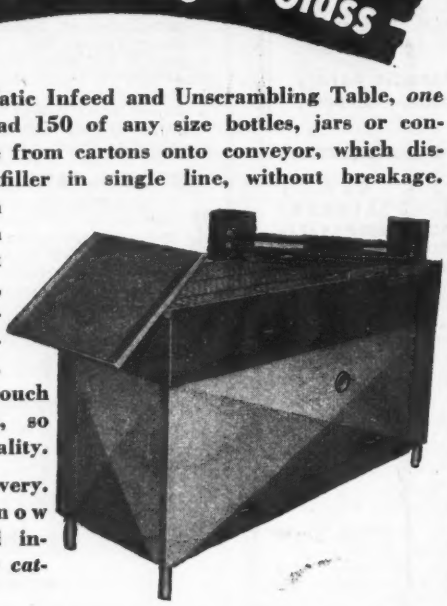
10—Vacuum Pumps, Devine, Buffalo, Beach Russ
20—Rotary and Centrifugal Pumps, 1" to 6"
5—Rotex, Tyler Screens, 20" x 48", to 4' x 5'
4—Tablet Machines, ¼" to 1½" dies.
Bucket Elevators, Screw Conveyors, etc.

PARTIAL LISTING ONLY.
YOUR INQUIRIES SOLICITED.

BRILL Equipment Co.
183 VARICK STREET NEW YORK
Zone 14

Cut Bottle Unloading Cost When Converting to Glass

With a Styl-O-Matic Infeed and Unscrambling Table, *one* operator can unload 150 of any size bottles, jars or containers per minute from cartons onto conveyor, which discharges them to filler in single line, without breakage. This is more than *two* operators can handle by hand. It reduces labor costs, increases production, saves breakage and floor space. Operator doesn't touch mouth of bottles, so sanitation is a reality.



Prompt delivery. High priorities now available for food industries. *Write for catalog.*

ISLAND EQUIPMENT & SUPPLY CO., Inc.
101 Park Avenue — New York, N. Y.

Styl-O-Matic Unscrambler

WHY USE YOUR HANDS ?

When 80% of all industrial applications can be regulated by inexpensive

SARCO Temperature Control

A skilled worker is a poor valve tender at best. His active mind and hands are too busy elsewhere — and his time is needed now more than ever before. That's one reason why the Cherry-Burrell Corporation equips this ingenious bottle washer with Sarco type TR-50 controls for the wash water and Sarco No. 87S for the rinse tanks. Now every machine that leaves their plant is bound to perform — always the same temperatures — no cracked bottles, no wasted heat or water. Catalog Nos. 550 and 600.

156

SARCO SAVES STEAM — SARCO COMPANY, INC. 475 Fifth Avenue, New York, N. Y. Sarco Canada Ltd., Federal Bldg., Toronto, Ont.

ADVERTISERS

	PAGE
Acker Organization, Inc., W. M.	168
Alba Pharmaceutical Division, Winthrop Chem. Co.	182
• Allis-Chalmers Mfg. Co.	9, 41, 51
• Alloy Steel Products Co. Inc.	26
Aluminum Cooking Utensil Co.	10
American Can Co.	56
American Coolair Corp.	108
American Cyanamid & Chemical Corp.	175
American Monorail Co.	126
• Anchor Hocking Glass Corp.	49
• Armstrong Cork Co.	99, 100
Audubon Wire Cloth Co. Inc.	137
Baker Ice Machine Co. Inc.	162
Barnstead Still & Sterilizer Co. Inc.	146
Battletown Fruit Co.	192
Bausch & Lomb Optical Co.	46
Bemis Bros. Bag Co.	55
Brill Equipment Co.	193
Bristol Co.	45
• Brown Instrument Co.	165
Bryant Heater Co.	156-157
Buell Engineering Co.	34
• Buffalo Forge Co.	177
Burkhard, Inc. Thos.	193
Calcium Chloride Assn.	52
Carpenter Steel Co.	186
Carrier Corp.	196
Celotex Corp.	164
Century Electric Co.	37
Chain Belt Co.	169
Cleaver-Brooks Co.	35
Commonwealth Press	190
Consolidated Products Co. Inc.	190
Consolidated Siphon Supply Co., Inc.	152
Continental Can Co.	39
• Corn Products Sales Co.	148
• Corning Glass Works	28
Creamery Package Mfg. Co.	40
Crown Can Company	102
Cuno Engineering Corp.	53
• Cyclone Fence Co.	170
Damrow Bros. Co.	178
Darnell Corp. Ltd.	144
Diamond Crystal Salt Co.	134
Distillation Products Inc.	150
• Diversey Corp. The	111
• Dobeckmun Co., The	6
• Dodge & Olcott Co.	152
• Douthitt Corp.	141
Dow Chemical Co.	50
du Pont de Nemours & Co., Inc., E. I. (Electro-Chemicals Dept.)	118
• Economic Machinery Co.	145
Edgemoor Iron Works	106
Electro Metallurgical Co.	174
Enterprise Mfg. Co. of Pa.	109
Eppenbach, Inc.	122
Exact Weight Scale Co.	180
• Fairbanks, Morse & Co.	120
Ferry Co., J. D.	133
First Machinery Corp.	191
• Florasynth Laboratories, Inc.	147
Food Industries Catalog & Directory	184
Food Research Laboratories, Inc.	140
Frick Co.	116
Gardner-Denver Co.	38
• Gardner-Richardson Co.	Third Cover
• General Electric Co.	12-13, 24
General Motors Truck Co.	163
Goodyear Tire & Rubber Co. (Pliofilm Sales Dept.)	Second Cover
Greer & Co., J. W.	11
Gruendler Crusher Co.	172
• Gump Co., B. F.	147
Hersey Mfg. Co.	48
Hinde & Dauch	130
• Hoffmann-La Roche, Inc.	142
Hottmann Machine Co.	161
• Howes Co., Inc. S.	168
Hunter Machine Co., James	181
• Ingersoll Rand Co.	5
Inland Steel Container Co.	173
Island Equipment & Supply Co. Inc.	192, 194
• Jacobowitz Co., Chas. S.	192
• Jeffrey Mfg. Co.	162
Jenkins Bros.	23
• Johns-Manville Corp.	176
• Kalamazoo Vegetable Parchment Co.	158
• Keasbey & Mattison, Inc.	32
Kehoe Machinery Corp., Lester	193
Kerby Saunders, Inc.	135
• Koven & Bros. Inc., L. O.	164
Kuhns Bros. Co.	180
Lancaster, Allwine & Rommel	154
Lawler Co.	193
LaPorte Mat & Mfg. Co.	186
• Lee Metal Products Co. Inc.	182
• Leeds & Northrup Co.	54
Lewfrank Industrial Corp.	192
• Link-Belt Co.	7
Liquidometer Corp.	172
Loeb Equipment Supply Co.	193
Machinery & Equipment Corp. (New York City)	193
Machinery & Equipment Co. (San Francisco)	192
Mack Mfg. Corp.	36
Main, Inc., Chas. T.	183
Master Electric Co.	25
McGraw-Hill Book Co.	138
McLaurin-Jones Co.	168
• Mears-Kane-Ofeldt, Inc.	132
Menasha Products Co.	171
Mercer-Robinson Co.	116

IN THIS ISSUE

	PAGE
Mercoid Corp.	170
Meyercord Co.	182
Modine Mfg. Co.	160
• Monsanto Chemical Co.	115
• Mundet Cork Corp.	123
• Nash Engineering Co.	97
National Aniline Div., Allied Chem. & Dye Corp.	152
• National Can Corp.	166-167
National Cold Storage Co. Inc., The	154
• National Technical Laboratories	127
Niagara Blower Co.	170
• Nutritional Research Associates, Inc.	154
• Oakite Products Inc.	117
• Orr & Sembower, Inc.	183
• Package Machinery Co.	105
Palmer, Inc., Frank D.	21
Paterson Parchment Paper Co.	124
Perry Equipment & Supply Co.	192
• Pfaudler Co.	8
• Pfizer & Co. Inc., Chas.	151
Philadelphia Quartz Co.	112
Pittsburgh Lectrodryer Corp.	42
• Pomona Pump Co.	20
• Powers Regulator Co.	114, 154
• Premier Mill Corp.	188
• Proctor & Schwartz, Inc.	16-17
• Pulverizing Machinery Co.	195
Quaker City Cold Storage Co.	154
Rathke & Co.	190
Reinhold Publ. Corp.	172
Reynolds Metals Co. Inc.	19
Rhinelander Paper Co.	31
• Riegel Paper Corp.	4
Riggs & Lombard Inc.	159
Robinson Bros.	112
Rockwell's Bakery Inc.	192
• Rossotti Lithographing Co. Inc.	101
Royal & Co., Thomas M.	189
Ryerson & Son, J. T.	195
• Safety Car Heating & Lighting Co. Inc.	139
St. Regis Paper Co.	27
• Sarco Company	194
Savage Bros. Co.	193
Schwarz Laboratories, Inc.	154
Seedburo Equipment Co.	129
Sethness Products Co.	154
Snell, Inc., Foster D.	154
Sprout, Waldron & Co.	187
Standard Conveyor Corp.	113
Standard Oil Co. (Indiana)	185
Stein, Hall & Co. Inc.	154
• Stokes Machine Co., F. J.	155
Stokes & Smith Co.	176
Taylor Instrument Cos.	14
Terwilliger & Wakefield, Inc.	192
Texas Co.	Back Cover
Timken Roller Bearing Co.	33
Towmotor Co.	128
• Tri-Clover Machinery Co.	140
Twitchell Inc., E. W.	110
Union Carbide & Carbon Corp.	174
Union Special Machine Co.	178
Union Standard Equipment Co.	193
U. S. Electrical Motors	29-30
• U. S. Envelope Co.	43
Van Heeden, Arthur	154
Victor Chemical Works	153
Viking Pump Co.	108
Vilter Mfg. Co.	107
Viobin Corp.	154
Walworth Co.	179
• Webster & Co., Warren	44
• Wheelco Instruments Co.	22
• Worthington Pump & Machinery Corp.	18
Wright's Automatic Machinery Co.	47
Wyandotte Chemicals Corp.	136
• Yarnall-Waring Co.	15

• For further detailed information regarding this company's products see the 1943

FOOD INDUSTRIES

CATALOG & DIRECTORY

Materials for the Food Manufacturer—154

•

PROFESSIONAL SERVICES—154

•

STORAGE, Frozen Foods—154

•

WHERE TO BUY—154

•

SEARCHLIGHT SECTION

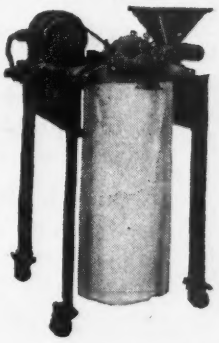
Classified Advertising

BUSINESS OPPORTUNITIES	190
EMPLOYMENT	190
SELLING OPPORTUNITIES	190
USED EQUIPMENT	190-193
WANTED TO PURCHASE	192

RYERSON CERTIFIED STEELS

Prompt Shipment from 10 Strategically-Located Steel-Service Plants... Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structurals, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes and Fittings, Mechanical Tubing, Rivets, Bolts, Nuts, Washers, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Detroit, Buffalo, Cincinnati, Cleveland, Boston, Philadelphia, Jersey City.

MORE THAN 1000 MATERIALS TESTED



In 20 years, our laboratories have made 17,000 test runs covering the grinding of more than 1000 different materials in Mikro-Pulverizers. We have amassed a fund of information valuable to processors needing pulverizing machinery. Submit your material for free test grind or check with our laboratories for records of tests made on materials similar to your own.

CHECK THESE ADVANTAGES

Dustless—no fans, cyclones, separators.

For Dry, Wet Milling or Granulating.

Saves in power—saves floor space—worked with unskilled labor.

Low operating cost — Fineness up to 99.9% through 325 mesh.

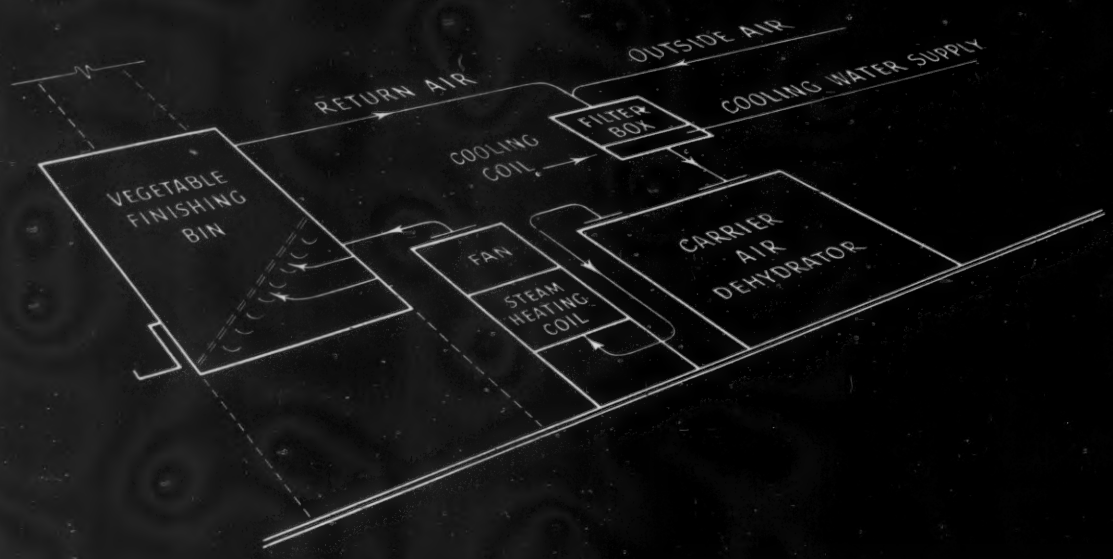
Send today for 32 page catalog.

PULVERIZING MACHINERY COMPANY

60 Chatham Road • Summit, New Jersey

MIKRO-PULVERIZER REG. U. S. PAT. OFF.

PROBLEM: To reduce moisture content in dehydrating vegetables to government specifications—as low as 3%



SOLUTION: Supplement existing drying equipment with mechanically dehumidified air in finishing bins

• While a large percentage of the moisture in vegetables can be removed rapidly during the *early* stages of the drying cycle, it is a difficult and time-consuming operation to reach specified low moisture contents with heat alone during the *final* drying stages. The one proved way to overcome this difficulty is to make a separate operation of the final stage through the use of "finishing bins" into which is introduced mechanically dried air.

Variations in the moisture content of outside air cause serious interruptions in production — particularly during humid weather. Where efforts are made to offset this by raising the temperature of the air, there is danger of scorching the product or otherwise affecting the high quality demanded.

Dehydrated air, or mechanically dried air — properly applied to finishing bins—is a proved answer to this problem. It increases capacity of plant and protects quality.

Because it is designed to mechanically remove moisture from air and to automatically maintain constant *inside* humidities regardless of variations of outside humidities, the Carrier Air Dehydrator is the ideal equipment to create the required conditions of air in finishing bins.

In this and other applications such as preventing moisture regain in hygroscopic food products after dehydration and during packaging, Carrier Air Conditioning plays a vital role in protecting the end product—prevents deterioration—maintains uniformity of product.

Further information about Carrier Supplemental Drying Equipment for food dehydration will be furnished gladly on request.

CARRIER CORPORATION, Syracuse, N.Y.

Carrier

ARMY E NAVY

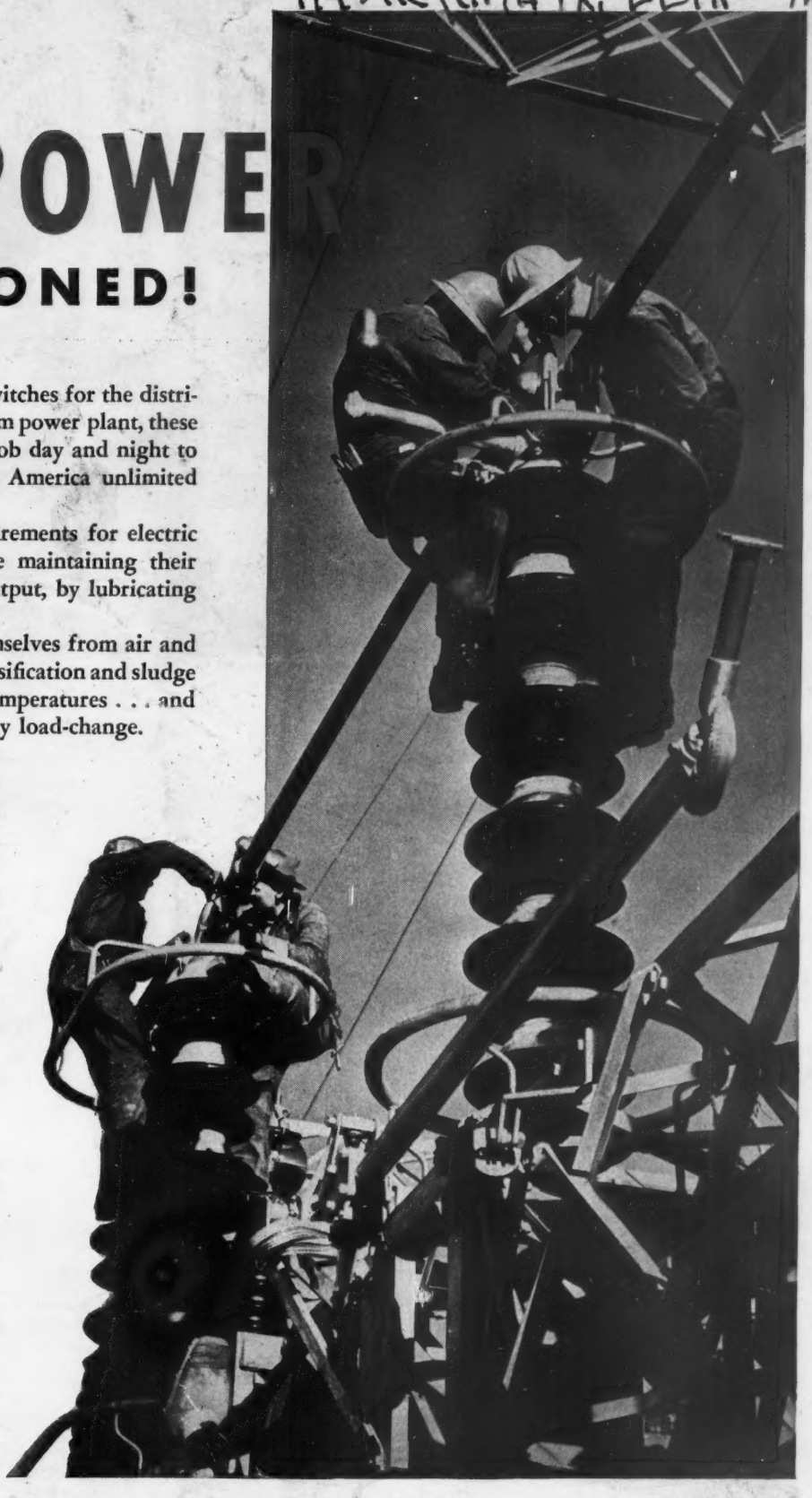
AIR CONDITIONING • REFRIGERATION

DEHYDRATION

FORTY-ONE YEARS EXPERIENCE IN INDUSTRIAL INSTALLATIONS

119 VIRGINIA PK. DETROIT MICH

WAR POWER
. . . UNRATIONED!



ASSEMBLING giant high tension switches for the distribution centre of Grand Coulee Dam power plant, these men are typical of thousands on the job day and night to make available to the war plants of America unlimited electric power.

To handle industry's wartime requirements for electric energy, power plants everywhere are maintaining their steam turbines at maximum power output, by lubricating them with *Texaco Regal Oil.*

Texaco Regal Oils rapidly free themselves from air and water, and highly resist oxidation, emulsification and sludge formation, assuring normal bearing temperatures . . . and governors instantly responsive to every load-change.

So effective have Texaco lubricants proved that they are definitely preferred in many other important fields, a few of which are listed below.

A Texaco Lubrication Engineer will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just write [illegible] than 2nd

XACO

★ More [illegible], more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

TEXACO
REG. T. M.

TEXACO Regal Oils
FOR ALL TURBINES

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT – CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

487

EGGS A LA GUADALCANAL

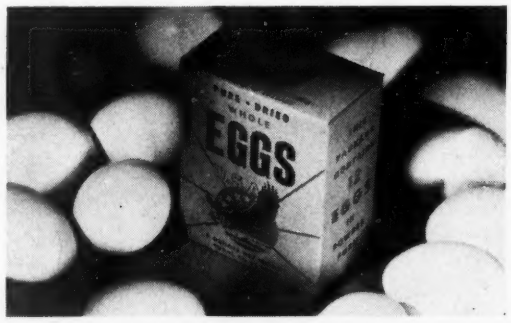
RECIPE:
Dehydrate eggs (leave water in America)
Package in "Precision-Engineered" paperboard cartons
Convoy across Pacific
(in about 1/10 the space)
Cook under coconut palms

With our fighting fronts thousands of miles from the nearest home port, it's a weighty problem to keep our fighting men well fed. But it's a less weighty (and less bulky) problem when eggs, vegetables and dairy products are dehydrated before they are loaded on to a ship.

An egg, for example, contains 65 per cent water. A potato, 78 per cent. Peas —74 per cent. But when dehydrated and packaged in light, specially-developed paperboard cartons, they save on an average of 90 per cent in cargo space—*and cargo space is of first importance today!*

★ ★ ★

Here, at Gardner-Richardson, we have developed specialized containe. paperboard to meet the needs of armed forces, also to meet essential civilian needs. Some day these developments and improvements will be available for the more practical packaging of the products of peace.



The GARDNER-RICHARDSON Co.

Manufacturers of Folding Cartons and Boxboard

MIDDLETOWN, OHIO

Sales Representatives in Principal Cities: PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • NEW YORK • BOSTON • PITTSBURGH • DETROIT